TEACHING

A QUARTERLY TECHNICAL JOURNAL

FOR TEACHERS

DECEMBER 1952

VOLUME XXV NUMBER 2

PRICE Re 1-4

CONTENTS

INTRODUCTORY NOTE 37
By E. W. MENZEL, M.A., St Paul's High School, Raipur

MEASURING THE INTELLIGENCES 40
By A. EDWIN HARPER, JR, Ph.D., Ewing Christian College, Allahabad

DO'S AND DONT'S FOR INTELLIGENCE TESTERS IN INDIA AND PAKISTAN 48
By E. W. MENZEL, M.A., St Paul's High School, Raipur

VOCATIONAL GUIDANCE 53
By G. D. BOAZ, M.A., D.Phil., University of Madras, Madras

STANDARDIZATION OF TESTS OF INTELLIGENCE 57
By P. K. ROY, M.A., B.T., B.Ed., Central Institute of Education, Delhi

SUPERNORMAL AND SUBNORMAL CHILDREN 63
By V. V. KAMAT, Ph.D., The Indian Institute of Education, Bombay

BIBLIOGRAPHY 70

BOOK REVIEWS 71
Progress of Education in India, 1937–47. Education in India, 1947–48. Education in the States of Indian Union, 1948–49. Education in Universities in India, 1948–49. E. W. Menzel: *Suggestions for the Use of New-Type Tests in India.*

SUBSCRIPTIONS

Publication: Quarterly—September, December, March, June.

Annual: Rs 4 (Ind.) or Rs 3-8 (Pak.), post free to places in India, Pakistan, Burma and Ceylon. V.P. charges extra.

Subscriptions should be paid in advance. Subscribers in Pakistan should apply to: Oxford University Press
P.O. Box 2079, Karachi

Single copies: Vols. I-XV, 12 as. each. Vols. XVI-XXIV, Re 1 each. Vol. XXV onwards, Re 1-4. (The following are out of print: Vol. I, 1; II, 1; V, 1; VII, 1, 2, 3; IX, 4; X, 1; XI, 1, 2; XII, 2; XIII, 2; XV, 2, 3; XVI, 1; XVII, 2, 3; XIX, 3; XX, 2, 3; XXIV, 3.)

Foreign:
Annual: 7*s.*, post free.
Single copies: 2*s.*, postage extra.

Complete cloth-bound volumes:
All volumes except I, VII, and XII, Rs 7 each, post free.

Renewal of subscription: Please mention your subscription number, printed on the wrapper.

ARTICLES

Should be of a practical character, with author's full name and address, and *must reach the Editor eight weeks before the month in which publication is desired.*

Articles published elsewhere or under consideration elsewhere will not be accepted. A statement should accompany each article to the effect that it is not under consideration for publication elsewhere at the time of submission and will not be submitted for publication elsewhere unless and until it has been definitely rejected by TEACHING.

Payment for articles includes the purchase of copyright.

The Editor is not responsible for the return of any MSS.

The rights of translation and reproduction are strictly reserved by TEACHING.

Articles should be addressed to:
The Editor, TEACHING
c/o Oxford University Press
Post Box 31, Bombay 1

ADVERTISEMENTS

Applications for advertisement rates should be addressed to the Manager, Oxford University Press, Post Box 31, Bombay 1.

A QUARTERLY LIST OF RECENT BOOKS

No. 22] [DECEMBER 1952

PUBLISHED BY

OXFORD UNIVERSITY PRESS
GEORGE G. HARRAP & CO. LTD
UNIVERSITY TUTORIAL PRESS
AMERICAN UNIVERSITY PRESSES

OXFORD HOUSE [POST BOX 31] BOMBAY
LAL BAZAR [POST BOX 530] CALCUTTA
MOUNT ROAD [POST BOX 340] MADRAS

NOTES

(i) All prices are subject to alteration without notice.
(ii) Sterling prices are converted normally at 13 annas to a shilling.
(iii) Publishers' names are only supplied when books are *not* published by the Oxford University Press.
(iv) This list consists of two sections: 'General' and 'Educational'.
(v) The arrangements in both sections generally follows the Dewey Decimal system of classification under the following main headings:

General Works	(000)	Pure Science	(500)
Philosophy	(100)	Applied Science	(600)
Religion	(200)	Fine Arts	(700)
Social Sciences	(300)	Literature	(800)
Linguistics	(400)	History	(900)

GENERAL

PHILOSOPHY (100)

The Theory of Universals
By *R. I. AARON* Demy 8vo pp. 256 21*s*

Avicenna's Psychology: An English Translation of *Kitab al-Najat*, Book II, Chapter VI, with Historico-Philosophical Notes and Textual improvements on the Cairo edition
By *F. RAHMAN* Demy 8vo pp. 140 12*s* 6*d*

The Philosophy of Aristotle (*Home University Library*, 222)
By *D. J. ALLAN* F'cap 8vo pp. 226 6*s*

Nietzsche: Philosopher, Psychologist, Antichrist
By *W. A. KAUFMANN* Med. 8vo pp. 422 Rs 30–0 *Princeton*

PSYCHOLOGY (150)

Factor Analysis of Reasoning Tests
By *DOROTHY C. ADKINS* and *SAMUEL B. LYERLY*
Demy 4to pp. 128 Rs 10–0 *North Carolina*

The Psychology of Religion (*Home University Library*, 221)
By *L. W. GRENSTED* F'cap 8vo pp. 190 6*s*

RELIGION (200)

The Liturgy of the Church of South India
By *T. S. GARRETT* Demy 12mo pp. 104 Rs 2–0

Zoroaster: Politician or Witch-Doctor (*Ratanbai Katrak Lectures*, 1949)
By *W. B. HENNING* Demy 8vo pp. 52 5*s*

SOCIAL SCIENCES (300)

SOCIOLOGY (301)

Faces in the Crowd: Individual Studies in Character and Politics
By *DAVID RIESMAN* Med 8vo pp. 764 Rs 25–0 *Yale*

The Structure of Society
By *MARION J. LEVY* Med 8vo pp. 604 Rs 30-0 *Princeton*

POLITICAL SCIENCE (320)

The States and Subversion
Edited by *WALTER GELLHORN* Demy 8vo pp. 464 Rs 25–0 *Cornell*

British Colonial Constitutions
By *MARTIN WIGHT* Demy 8vo pp. 598 42*s*

INTERNATIONAL RELATIONS (327)

The Middle East in World Affairs
By *GEORGE LENCZOWSKI* Med 8vo pp. 480 Rs 30–0 *Cornell*

Survey of British Commonwealth Affairs: Problems of External Policy, 1931-1939 (*Royal Institute of International Affairs*)
By *N. MANSERGH* Roy 8vo pp. 502 42*s*

Documents on International Affairs, 1947-48 (*Royal Institute of International Affairs*)
Selected and ed. by *MARGARET CARLYLE* Roy 8vo pp. 908 70*s*

Great Britain and Egypt, 1914-1951 (*Royal Institute of International Affairs. Information Paper*, 19)
Demy 8vo pp. 224 11*s* 6*d*

Contemporary Problems
By *P. G. ROGERS* Cr 8vo pp. 204 6*s* *University Tutorial Press*

American Crisis Diplomacy: The Quest for Collective Security 1918-52
By *RIGHARD W. VAN ALSTYNE*
Med 8vo pp. 180 Rs 17-8 *Stanford*

The United States and the Far East, 1945-1951
By *HAROLD M. VINACKE* Pott 8vo pp. 152 Rs 15-0 *Stanford*

Red Flag in Japan: International Communism in Action, 1919-1951
By *RODGER SWEARINGEN* and *PAUL LANGER*
Med 8vo pp. 288 Rs 25-0 *Harvard*

ECONOMICS (330)

The Man on the Assembly Line
By *CHARLES R. WALKER* and *ROBERT H. GUEST*
Demy 8vo pp. 190 Rs 16-4 *Harvard*

LAW (340)

Morals and Law: The Growth of Aristotle's Legal Theory
By *MAX HAMBURGER* Med 8vo pp. 214 Rs 18-12 *Yale*

Administrative Agencies and the Courts (*Michigan Legal Studies*)
By *FRANK E. COOPER* Med 8vo pp. 496 Rs 25-0 *Michigan*

Let Justice Be Done: An Account of English Criminal Law and Procedure (*Social Science Studies*)
By *F. T. GILES* Cr 8vo pp. 52 2*s*

Loyalty and Legislative Action: A Survey of Activity by the New York State Legislature, 1919-1949 (*Cornell Studies in Civil Liberty*)
By *LAWRENCE H. CHAMBERLAIN*
Demy 8vo pp. 264 Rs 20-0 *Cornell*

The Colleges and the Courts, 1946-50: Judicial Decisions regarding Higher Education in the United States
By *M. M. CHAMBERS* Med 8vo pp. 212 Rs 15-0 *Columbia*

PUBLIC ADMINISTRATION (350)

Public Administration in Hong Kong (*Royal Institute of International Affairs*)
By *Sir CHARLES COLLINS* Demy 8vo pp. 200 15*s*

PURE SCIENCES (500)

MATHEMATICS (510)

Algebraic Projective Geometry
By *J. G. SEMPLE* and *G. T. KNEEBONE* Demy 8vo pp. 412 35*s*

Mathematical Models
By *H. MARTYN CUNDY* and *A. P. ROLLETT*
Demy 8vo pp. 240 21*s*

Elementary Co-ordinate Geometry
By *E. A. MAXWELL* Demy 8vo pp. 288 18*s* 6*d*

Typical Means (*Tata Institute of Fundamental Research, Monographs on Mathematics and Physics*)
By *K. CHANDRASEKHARAN* and *S. MINAKSHISUNDARAM*
Roy 8vo pp. 152 Rs 22-8

PHYSICS (530)

Detonation in Condensed Explosives (*Monographs on the Physics and Chemistry of Materials*)
By *J. TAYLOR* Demy 8vo pp. 208 + 18 pp. half-tone plates 25*s*

Ferromagnetic Properties of Metals and Alloys (*Monographs on the Physics and Chemistry of Materials*)
By *K. HOSELITZ* Demy 8vo pp. 330 40*s*

CHEMISTRY (540)

Mixtures: The Theory of the Equilibrium Properties of Some Simple Classes of Mixtures, Solutions and Alloys (*International Series of Monographs on Physics*)
By *E. A. GUGGENHEIM* Med 8vo pp. 280 42*s*

Hydrogen Ion Concentration: New Concepts in a Systematic Treatment
By *J. E. RICCI* Med 8vo pp. 496 Rs 50-0 *Princeton*

Chemistry in Action
By *G. M. RAWLINS* and *A. M. STRUBLE*
Med 8vo Second edition, 1952 pp. 584 21*s* *Harrap*

BIOLOGY AND ANTHROPOLOGY (570)

Morphogenesis: An Essay on Development
By *JOHN TYLER BONNER* Demy 8vo pp. 308 Rs 25-0 *Princeton*

Religion and Society among the Coorgs of South India
By *M. N. SRINIVAS* Demy 8vo pp. 278 30*s*

BOTANY (580)

A Class-Book of Botany
By *A. C. DUTTA* Demy 8vo Eighth edition, 1952 pp. 532 Rs 9-8

APPLIED SCIENCES (600)

MEDICINE (610)

Enzymes and Enzyme Systems: Their State in Nature
Edited by *JOHN T. EDSALL* Demy 8vo pp. 160 Rs 15-0 *Harvard*

The Clinical Application of Antibiotics: Penicillin (*Oxford Medical Publications*)
By *M. E. FLOREY* Roy 8vo pp. 744 £4 4*s*

British Medical Bulletin Vol. 8
Nos. 2-3: Isotopes in Medicine Rs 14-10
No. 4: Cardiovascular Research Rs 10-3

Injury of the Xiphoid
By *MICHAEL BURMAN* and *SAMUEL E. SINBERG*
Med 8vo pp. 104 Rs 17-8 *Columbia*

Applied Physiology: (*Oxford Medical Publications*)
By *SAMSON WRIGHT* with the collaboration of *M. MAIZELS* and *J. P. JEPSON* Demy 8vo Ninth edition, 1952 pp. 1206 50*s*

FINE ARTS (700)

Child Artists of the Australian Bush
By *MARY DURACK MILLER*
Demy 8vo pp. 80 + 36 plates 15*s* *Harrap*

Symmetry
By *HERMANN WEYL* Demy 8vo pp. 176 Rs 18-12 *Princeton*

INDOOR ENTERTAINMENT (793)

A History of Board-Games other than Chess
By *H. J. R. MURRAY* Med 8vo pp. 282 42*s*

LITERATURE (800)

ENGLISH (820)

The Occasional Verses of Richard Steele
Edited by *RAE BLANCHARD* Med 8vo pp. 162 21*s*

Shakespeare's World of Images: The Development of his Moral Ideas
By *DONALD A. STAUFFER* Demy 8vo pp. 394 25*s*

Aylwin: A Romance of Snowdon (*World's Classics*, 52)
By *THEODORE WATTS-DUNTON* Pott 8vo pp. 534 5*s*

The Buried Life: A Study of the Relations between Thackeray's Fiction and his Personal History
By *GORDON N. RAY* Demy 8vo pp. 154 12*s* 6*d*

Newman's Idea of a Liberal Education: A Selection from the Works of Newman (*Life, Literature and Thought Library*)
Edited by *HENRY TRISTRAM* Cr 8vo pp. 220 7*s* *Harrap*

The Poetic Approach to Language: With Special Reference to the History of English
By *V. K. GOKAK* Cr 8vo pp. 260 Rs 15-0

HINDI (891)

The Holy Lake of the Acts of Rama: A New Translation of Tulasi Das's Ramacaritamanasa
By *W. D. P. HILL* Demy 8vo pp. 576 Rs 15-0

HISTORY (900)

A Short History of Switzerland
By *E. BONJOUR, H. S. OFFLER* and *G. R. POTTER*
Demy 8vo pp. 394 35*s*

GEOGRAPHY (910)

Human Geography
By *JEAN BRUNHES.* Translated by *ERNEST F. ROW*
Cr. 4to pp. 256 + 40 pages half-tone illustrations 25*s* *Harrap*

Climate Near the Ground
By *RUDOLF GEIGER* Demy 8vo pp. 150 Rs 15-0 *Harvard*

BIOGRAPHY (920)

The Story of Bapu
By *SHAKUNTALA MASANI* Imp 16mo pp. 96 Rs 4-0

Father Douglass of Behala
By some of his friends Post 8vo pp. 172 10*s* 6*d*

EDUCATIONAL

BOOKS FOR TEACHERS

How to Choose Your School
By *J. F. WOLFENDEN* Cr 8vo pp. 118 7*s* 6*d*

Vocational Training in the South Pacific
By *R. A. DERRICK* Demy 8vo pp. 276 30*s*

Suggestions for the Use of New-type Tests in India (*Teaching in India Series, 8*)
By *E. W. MENZEL* Cr 8vo Third edition, 1952 pp. 290 Rs 3-8

How to Study (*Teaching in India Series, 19*)
By *E. W. MENZEL* Cr 8vo pp. 276 Rs 4-0

LANGUAGE BOOKS FOR SCHOOLS AND COLLEGES

ENGLISH

Our Everyday World (*Second Series*)
By *MARY McNEILE* and *ARNRID JOHNSTON*
Cr 8vo pp. 32 1*s* 6*d* each
The Railway Station The Market The Park

Tales from the Indian Drama (*The Golden Series*)
By *C. A. KINCAID* Cr 8vo Third edition, 1952 pp. 80 Re 1-0

The Golden Gate
Cr 8vo pp. 132 Rs 2-8

Henry the Fourth, Part I (*The New Clarendon Shakespeare*)
Edited by *BERTRAM NEWMAN* F'cap 8vo pp. 192 4*s* 6*d*

Thirty Burmese Tales
By *MAUNG HTIN AUNG* Cr 8vo pp. 118 Rs 2-12

All Kinds of Adventure: An Anthology (*Harrap's Junior Modern English Series*)
Edited by *G. F. LAMB* Cr 8vo pp. 192 4*s* *Harrap*

FRENCH

Topaze (*Heath's Modern Language Series*)
By *MARCEL PAGNOL* F'cap 8vo pp. 176 3*s* 6*d* *Harrap*

CHANGES IN PRICE SINCE SEPTEMBER 1952

	Rs.	A.
English		
BRAYNE, F. L. and RYBURN, W. M., *Village Readers*, Combined Edition. Reader IV	0	14
CHILDREN'S BOOKSHELF		
Book of Heroines	0	15
Book of Robinhood	1	0
Book of Saints	0	15
Tales from Dickens	0	15
Water Babies	1	0
KINCAID, C. A., *Tales from the Indian Drama*	1	0
SOARES, A. X., and MAJMUDAR, M. N., *Junior Course in English Composition*	3	0
Kannada		
ACHARLU, K. SRINIVASA, *Manoranjaka Vakyarachane*, Book II ...	0	5½
Tamil		
SCUDDER, H. T., *Makkal Vazhtalum Pizhaittalum*, Books I-III *each* ...	1	10

BOOKS OUT OF PRINT

English

AIYAR, S. BALAKRISHNA, *Elementary Mathematics*, Books IV and VI

DRUITT, A. M., *The Beginnings of English History*

" " *England in the 16th and 17th Centuries*

Tenali Rama and Mariada Rama, Stories and Adventures of

TURNBULL, E. LUCIA and H.G.D., *Golden Wonder Tales*

Burmese

DRUITT, A. M., *Ingalake Yazawin E Mula Asa* (The Beginnings of English History)

Hindi

DIPPIE, H., *Sikshana Sopan* (Primary School Teachers' Handbook) Sections I, IX and X

GUPTA, R. C., and SHARMA, G. L., *Oxford Ki Angrezi aur Hindi Ki Vyaharan* (Oxford Anglo-Hindi Grammars), Book II

Malayalam

JOSEPH, ANNIE, *Arogya Rakshayam Prakrithi Padavum* (Domestic Science and Nature Study), Books I and II

Tamil

AIYAR, S. BALAKRISHNA, *Ilaghu Ganitham* (Elementary Mathematics), Books III-V

PICKLES, H., *Indiavum Ulagamum British Perarasum* (India, World and Empire)

RAWLINSON, H. G., *India Makkalin Charittirach Churukkam* (History of the Indian People)

Telugu

PICKLES, H., *India Prapamchamu British Samrajyamu* (India, World and Empire)

PICKLES, H., *Unnatha Patasalaku Clarendon Bhoogola Shastramu* (Clarendon High School Geography of India)

VENKATACHARLU, A., *Prarambha Vignana Shasthramu* (Elementary General Science), Books II and III

PRINTED IN INDIA AT THE WESLEY PRESS AND PUBLISHING HOUSE, MYSORE CITY

MACMILLAN

BOOKS ON HEALTH AND HYGIENE

Manual of Hygiene and Domestic Economy (for use in India)
by C. BANKS, M.D. Revised by Lt.-Col. DENHAM WHITE, C.I.E., I.M.S. — Rs 2-4

The War of the Humans and the Mosquitoes
by Lt.-Col. SIR G. JOLLY, C.I.E. — 6*d.*

A First Book of Physiology and Hygiene
by G. D. CATHCART, M.B., B.Sc., D.P.H.
With 65 illustrations — 4*s.* 6*d.*

A Healthy Day by CYRIL BIBBY — 2*s.* 3*d.*

Healthy and Happy by CYRIL BIBBY — 2*s.* 9*d.*

Health and the Home by J. C. LAMONT, M.D. (*Arnold*) — 2*s.* 6*d.*
A hygiene and physiology book for girls, written by a skilled practitioner.

Look After Yourself by GEORGE H. PUMPHREY (*Arnold*) — 1*s.* 3*d.*
A profusely illustrated book on personal hygiene.

Look After Others by GEORGE H. PUMPHREY (*Arnold*) — 1*s.* 9*d.*
A book linking up civics with personal hygiene and sanitation, with illustrations.

The Healthy Way by EUNICE CLOSE (*Grant*) — 3*s.* 9*d.*

Growing Up by MARY THOMAS (*A. & C. Black*)
Part I, 5*s.* 6*d.*; Part II, 5*s.*
A book of health and hygiene for girls.

Child Care by EILEEN UNWIN — 3*s.* 6*d.*
A book of instruction for girls, or for teachers dealing with this subject.

MACMILLAN & CO. LTD

BOMBAY :: CALCUTTA :: MADRAS

DRYAD PRESS

BOOKS ON CRAFTWORK

THE JUNIOR BASKETMAKER

CHARLES CRAMPTON

This gives practical advice to the young worker on the selection of materials and tools. Technical terms are explained. Followed by full working instructions for simple articles, such as baskets, mats, trays, etc., all in cane. 36 pages, illustrated, 3*s*.

MAKING COLOUR PRINTS

An Approach to Lino Cutting

JOHN NEWICK

Explores a method of cutting and printing that is a real contribution to the craft. This method solves one of the educational problems in combining craft and self-expression. The author believes that colour printing from lino can achieve the same dignity as colour lithography. 60 pages, illustrated, 12*s*. 6*d*.

POTTERY WITHOUT A WHEEL

KEITH TYLER

For those without access to a Potter's Wheel. It deals with various methods of construction work which can be developed to a high level of craftsmanship. Also a wide range of practical application from beginners' work to suggestions for advanced pieces. Covers various methods of decoration, open firing and the construction of tools and equipment. 62 pages, illustrated, 5*s*.

WOVEN RUGS

RONALD GRIERSON

Deals entirely with rugs woven on a loom and shows that fine examples can be woven on the very simplest apparatus. All types of looms, from the very simple to the most complicated, are described in detail. There is also information on contemporary weaving, such as Tufting on a Khelim Ground, the Soumak Stitch and the Scandinavian Ryijy method. 52 pages, illustrated, 4*s*. 6*d*.

LIST OF EDUCATIONAL CRAFT BOOKS

SENT POST FREE ON REQUEST TO DEPT. 62

THE DRYAD PRESS

Leicester England

McGRAW–HILL

USEFUL REFERENCE BOOKS FOR TEACHERS

MEASURING EDUCATIONAL ACHIEVEMENT By MICHEELS and KARNES

For the education courses on tests and measurements, this book has been written as an aid to the instructor who makes his own tests and designs and other instruments for the measurement of educational achievement. Theory is kept to a minimum and examples have been drawn from industrial and other educational fields. 496 pages. $ 5.50.

AUDIO-VISUAL AIDS TO INSTRUCTION By McKOWN and ROBERTS

The revised second edition of this practical handbook shows teachers and school administrators how to select, organize and utilize audio-visual aids of all types for students from kindergarten to high school. 605 pages. $ 5.50.

FILMSTRIPS By FALCONER

A detailed analysis of filmstrips presenting everything that filmstrip users, in schools and colleges, need to know about them—what they are, how and when to use them, and how to project them. Intended primarily as a reference for teachers, it will also be of value to all who use visual aids in training programmes. 538 pages. $ 6.00.

GUIDANCE SERVICES IN SMALLER SCHOOLS By FROEHLICH

A simple and practical treatment of the nature of guidance services and methods which have been used successfully for providing them in small schools. These are pointed out as interrelated with other services which a school provides, and are viewed as a part of the total school programme. 352 pages. $ 4.50.

NEW DIRECTIONS IN SCIENCE TEACHING By LATON and POWERS

A Report on some of the activities of the Bureau of Educational Research in Science. 164 pages. $ 2.50.

THE STUDENT COUNCIL By McKOWN

Offers immediate, practical assistance to any educator, student, or individual interested in setting up, promoting, organizing, administering or improving a student council or a plan for youth participation in control. 351 pages. $ 3.60.

EDUCATIONAL SUPERVISION By McNERNEY

Indispensable reference for teachers in service and administrators, this book treats supervision as something that requires a well organized job of educational leadership in the various subject-matter fields as well as human-relations engineering. 341 pages. $ 4.00.

SUPERVISION OF PHYSICAL EDUCATION By EVANS and GANS

Gives superintendents, principals, and teachers an understanding of effective programmes in physical education and specific help in planning and conducting such programmes. 293 pages. $ 4.50.

READILY AVAILABLE FROM YOUR BOOKSELLER

Approval copies can be arranged through

W. G. GRAHAM, 63 New Marine Lines, Bombay 1

McGraw-Hill representative for India, Pakistan, Burma and Ceylon

For Your CHOICE of

BOOKS AND AIDS

Please write to: **VENUS BOOK STALL**

Appa Balwant Chowk, Poona 2

GRADED GENERAL KNOWLEDGE AND INTELLIGENCE TESTS

Prepared by N. C. HAYWARD *and* F. T. WALTON

'Fascinating little books which it is difficult to leave. . . Apart from their value in the schoolroom . . . they are likely to pass many a pleasant and instructive hour in the home.' *Birmingham Mail*

Book I. General Knowledge (Junior)
Book II. General Knowledge (Intermediate)
Book III. General Knowledge (Senior)
Book IV. General Knowledge (Our Mother Tongue)

Each 1*s.*

Answers to each book issued separately. 8*d.*

UNIVERSITY TUTORIAL PRESS LTD

Agents in India

OXFORD UNIVERSITY PRESS

What the Reviewers Say of the Second Edition of

MEASURING INTELLIGENCE OF INDIAN CHILDREN

By V. V. KAMAT

The Education Quarterly

'The study is of great value to students of education and psychology, and particularly to the freshly trained graduate teachers who are interested in work in the field of measurement.'

Journal of the M.S. University of Baroda

'Dr Kamat has done pioneer work on intelligence testing of Indian children.'

The Moga Journal for Teachers

'The book is well written. . . It is simple enough for the beginning student but has a wealth of material for the advanced worker.'

National Christian Council Review

'. . . an excellent and indispensable guide to anyone using the Binet-Simon Scale.'

Demy 8vo 260 pp. Rs 10

OXFORD UNIVERSITY PRESS

TEACHING

A QUARTERLY TECHNICAL JOURNAL FOR TEACHERS

Editor: MARGARET BENJAMIN

VOL. XXV DECEMBER 1952 No. 2

INTRODUCTORY NOTE

FOR the sake of those who are not familiar with the object and methods of intelligence testing a very brief introduction to their use is given herewith.

In the first place, they must not be confused with scholastic tests which use the new-type test forms. Here in India any examination which uses true-false, multiple choice, completion, or matching test forms is commonly called an Intelligence Test. This is misleading. The object of Intelligence Tests is to measure ability relatively independent of the amount and quality of the classroom teaching a student has received. Their object is not to find out what has been learned in school but what may be expected of the pupil on his own initiative without benefit of special teaching. Ideally, Intelligence Tests are supposed to measure ability independent of environmental influences (school and home are the most powerful environmental influences) but actually our surroundings influence our development so much that intelligence cannot help but be very greatly modified because of them. But Intelligence Test scores are far less dependent on what happens in the classroom than scholastic tests, and that gives them their real value. They can tell us whether a pupil's lack of success is due to poverty of his natural gifts or some such reason as wrong attitude to schooling, lack of faith in himself, poor groundwork in teaching, unhappiness, or some other factor which may be brought under control. The usefulness of Intelligence Tests is strictly limited and it is easy to exaggerate and to underestimate their importance. In the hands of a careful person who does not make snap judgements and who is alert to other symptoms of the pupil's abilities, they can be a valuable aid for advising a student whether to continue his schooling or not and the type of schooling which may be most helpful to him. They can help teachers and schools to recognize their own weaknesses and indicate the nature of the effort that should be put forward in the development of the individual.

The Intelligence Test score of a pupil is never to be communicated to him and rarely to his teacher or parents. It is information which the school head and the adviser to the student should know in order to

advise him intelligently but which he keeps to himself excepting when needed, as a doctor keeps some of the detail of a physical examination to himself unless telling it serves a really useful purpose.

An Intelligence Test score is meaningless unless we know the age of the pupil. A score of 80 in the case of a ten-year-old may indicate an exceptionally bright child. The same score on the same test by a sixteen-year-old indicates a hopelessly backward child. The ten-year-old child may expect to be able to do things in five years time which the sixteen-year-old has little or no prospect of learning how to do properly even if he makes strenuous effort for many years. The ten-year-old has already reached the learning rate of the sixteen-year-old and the rest of his life he will forge farther and farther ahead. An accurate intelligence rating indicates the possible rate of learning for the rest of one's life and not only during the school years. School tests try to tell where the student stands today. Intelligence Tests try to indicate where they will stand years ahead provided they work hard and have proper environmental advantages. The key to the secret which reveals the possibilities of future development is information as to what children can do at various ages. Therefore, we must know the age. Intelligence Test scores in America and England are usually given in terms of the Intelligence Quotient which takes into consideration the age as well as the marks secured. The Intelligence Quotient is a comparison with the normal child of the same age. An Intelligence Quotient (I.Q. for short) of 100, means the child is quite average or normal. An I.Q. of 125 means he is decidedly above normal, and 75 means he is definitely below normal. Here in India we cannot use I.Q. ratings as yet for we have not yet found out what the normal child growing up in the normal Indian environment can do; and what is the normal environment in India? Is it a condition of cultured upbringing or a condition of illiteracy? We shall have to agree on what is to be considered normal environment and educational privileges before we can make comparisons properly.

There are various kinds of Intelligence Tests. There are some which are given to one person at a time (the Binet Tests are the outstanding examples of this type). These are called Individual Tests. There are others which may be given to an entire class or even larger groups at the same time. These are called Group Tests. Individual Tests are more accurate but take much more time to give. Some tests are called non-verbal because very little or no language is required on the part of the examinee. These are especially useful where the literacy is low and where the mother-tongue of the examinee is different from that employed in a printed test form. The verbal tests make free use of language. Non-verbal tests are more accurate for measuring natural ability uninfluenced by schooling. But when you are dealing with children whose chances of further school success you wish to estimate, you want to know whether they are the type to profit from schooling. The verbal tests are more helpful in this than the non-verbal.

There is not only one kind of intelligence but there are many kinds. There is such a thing as general intelligence, that is intellectual power which is helpful in a large variety of new situations, i.e. it calls for more than a creature of mere habit. But it is also true that people do not exhibit the same amount of intelligence in all types of work they may be called upon to do. Some people develop little grammatical sense no matter how many courses they may take. But they may be very keen in discovering what is wrong with a piece of defective machinery. Some find mathematics a burden and some find it full of interesting puzzles. We are not equally keen or intelligent about everything. This is not entirely a matter of training. We differ from each other in natural inclinations and this quickly shows itself in the difference of the amount of intelligence with which we tackle different types of problems. From this it should be clear that the same person may do better on one kind of Intelligence Test than on another, also that Intelligence Tests can be framed to favour people with certain inclinations or interests or to discriminate against those with valuable but different interests. Therefore it is always pertinent to ask what kind of Intelligence Test was used. Also, in case you want to choose people with certain abilities it is possible to make up an Intelligence Test to favour just these persons. Since Intelligence Tests have been used so widely to help predict school success it is quite natural that many tests are prejudiced in that direction. This needs to be borne in mind. There is need for tests of various types to help choose individuals for particular types of work.

A practical Intelligence Test reflects some concession to the problem of selection of pupils for certain types of training but it should not be too specific in this direction. It should remain fairly general in scope. If it is not it becomes an Aptitude or Prognostic Test, which is akin to an Intelligence Test but has a specialistic interest. It is when Intelligence Tests are combined with Aptitude or Prognostic Tests that they become really helpful in selecting pupils for bifurcated courses.

In conclusion, it may be stated that Intelligence Testing is still in its early childhood in this country. Several usable tests have been constructed for use in India and Pakistan, both individual and group, verbal and non-verbal. There are tests in several languages. But very little use has been made of any of them by any but the authors. Aptitude testing, or the testing of special abilities, is still very much in its infancy. It will take greater interest on the part of the individual headmaster and educational administrator to bring these fallible but still very useful instruments of measurement into real use. More demand is needed to stimulate the construction and publishing of such tests. It is hoped that this number of TEACHING will stimulate the interest which may develop into a demand.

E. W. MENZEL

MEASURING THE INTELLIGENCES

Aptitude and Ability Tests

It used to be thought that a person was either intelligent or unintelligent. Now it is known that most people are *both* intelligent *and* unintelligent.[1] The student with high marks in biology may fail in mathematics; the brilliant mathematician may be quite unable to achieve success in English literature. The concept of 'intelligence' has, therefore, been largely discarded in favour of the concept of 'intelligences'. The former concept made a great contribution in the earlier history of psychology; but it has now been wrung fairly dry. The major contributions of today are coming in the form of tests of general aptitudes and of the even more specific primary mental abilities.

Factor Analysis

The statistical method by which the various intelligences that make up mental ability have been isolated is known as 'factor analysis'. This is not the place to go into the mathematical complexities of the various factor analysis techniques. Briefly, however, the method is this: many different tests are constructed, each made up of only one type of problem (e.g. adding 2-digit numbers, completing number series, identifying synonyms and antonyms, etc.). These tests are given to a large number of individuals. The inter-correlations of the various tests are calculated. Then, by complex mathematical manipulations, the matrix of correlations is reduced to the least number of factors which can account for all of the interrelationships among the tests. (This is somewhat like the process by which the printer, in order to reproduce a multi-coloured picture, reduces all the colours to combinations of three or four basic colours.) By examining the amount of each factor in each test, the various factors can be given names representing their psychological functions.

Different factor analysts have often given different names to these factors. Still, there is a large measure of agreement among them as to the basic 'vectors of the mind'. (Cf. Thurstone[2], French[3], Greene[4], Segal[5], etc.) A few of the commonly accepted mental factors are as follows:

[1] 'You and your Mental Abilities' Film Strip. Society for Visual Education, and Science Research Associates, 1950. (Available on rental from N.C.C. Audio-Visual Library, P.O. Agricultural Institute, Dist. Allahabad, and at Arogyavaram, Dist. Chittoor.)

[2] Thurstone, L.L., quoted in Bouthilet, Lorraine, and Byrne, Kathryn, *You and Your Mental Abilities*. Chicago, Science Research Associates, 1950.

[3] French, J. W., 'What is Factor Analysis?' *The College Board Review*, Number 10, March 1950, pp. 129–131.

[4] Greene, E.B., *Measurements of Human Behaviour*. New York, The Odyssey Press, 1941.

[5] Segal, D., *Intellectual Abilities in the Adolescent Period: Their Growth and Development*. Bulletin, 1948, No. 6, Office of Education, Federal Security Agency, Washington, D.C.

Number: The ability to add, subtract, multiply and divide quickly and accurately.

Arithmetic reasoning: The ability to know *whether* to add, to subtract, to multiply or to divide.

Word fluency: The ability to use words quickly and easily.

Verbal comprehension: The ability to understand words, sentences, etc.

Perceptual speed: The ability to see likenesses and differences quickly and accurately.

Space relations: The ability to translate two-dimensional diagrams into three-dimensional concepts, to manipulate them mentally, etc.

Mechanical reasoning: The ability to understand pulleys, levers, and other mechanical principles.

Associative memory: The ability to learn from experience, the ability to remember verbal, numerical, etc., associations.

The Organization of Abilities

Garrett[1] has shown that intelligence is relatively *un*differentiated at early ages. Up to early adolescence, the general level of intellectual ability (Spearman's 'g') is of primary importance. After late adolescence, however, the differences among the various abilities *within* the individual are of much greater importance than the differences in general ability *between* individuals.[2]

The abilities we have described above are relatively unrelated. By unrelated we mean that the amount of any one ability possessed by an individual does not in any way tell us the amount of any other ability possessed by him. He may be high in several, or low in several; more often he has both high and low abilities. To take a striking example, a man may be able to add long columns of figures with great speed and accuracy, and yet be completely unable to understand calculus. (He would make a good bookkeeper or accountant.) On the other hand, many brilliant mathematicians confess to being quite unable to carry out a long series of additions and multiplications quickly without making many errors. Perhaps this is a clue to the phenomenon of the student who does so well in high school mathematics, and then fails miserably in college; or for the fact that Albert Einstein is said to have failed his high school arithmetic examination. Of course, many people possess *both* arithmetical reasoning and numerical calculation abilities.

Each individual possesses a unique *pattern* of abilities or aptitudes. If we give the individual a set of tests, each measuring a specific factor, we can then draw a 'profile' or 'psychograph' of the individual's abilities. And, by matching up the individual's profile with the profiles of successful men in various occupations, we can help the individual to choose that occupation for which he is most suited. For example,

[1] Garrett, H. E., 'A Development Theory of Intelligence', *The American Psychologist*, 1: 372–8, Sept. 1946. [2] Segal, op. cit., pp. 9ff.

an engineer may need space relations, arithmetical reasoning, mechanical reasoning, and some verbal comprehension; whereas a machinist will more probably require a combination of space relations, mechanical reasoning, and numerical abilities. An accountant depends heavily on both numerical and perceptual speed; while a clerk-typist probably needs perceptual speed plus verbal comprehension. Research will indicate how, and in what proportions, each of the above-mentioned factors (as well as others of mechanical, musical, artistic ability, personality, etc.) enter into each type of occupation.

Aptitude Tests

There are, as yet, very few factorially pure Aptitude Tests available. Most Aptitude Tests measure, instead, a complex conglomeration of primary abilities which go to make success in some particular study or occupation. Thus there are tests of physics and chemistry aptitude, which include elements of mathematics, verbal comprehension, general scientific knowledge, etc. There are tests of legal, or medical, or language, or engineering aptitude which contain many different types of materials which have been found to be relevant to predicting success in these activities. From a series of these tests, also, an individual profile may be made, which will help a person to choose his profession.

The test user should be warned, however, that the *name* of a test does not necessarily tell one what the test actually measures. The name is merely what the test-maker hopes the test measures. One must demand outside criteria, e.g. correlational studies with other tests and measures of success, in order to know what a test really measures. For example, it is now known that most so-called Intelligence Tests are actually only scholastic Aptitude Tests; they often have little or nothing to do with the kinds of intelligence needed for various non-scholastic activities.

The Use of American-made Tests

A large number of Aptitude Tests have been constructed in the U.S.A., and are available for use by psychologists there. Some are very good; some are very poor or even useless; most are merely mediocre. However, it is questionable whether any (except, perhaps, the Seashore and the Drake Music Aptitude Tests) are of much use in India. They need extensive adaptation before much faith can be placed in them here. The reason for this lies in the necessarily heavy reliance of most Aptitude Tests upon cultural items. A few Aptitude Tests can be constructed from abstract, culturally meaningless (i.e. non-culture-bound) materials. Tests of music or of space relations abilities are often of this type. In most cases, however, the only measure of aptitude available is through learning. A test is made up of items which all of the subjects can be presumed to have had an equal opportunity to learn. Then, if some have learned more than others, we conclude that they probably started with a

greater ability to learn those particular types of items. And we go on to predict that they will continue to learn those types of things better than others.

It is obvious that what Americans may have an equal opportunity to learn may often be quite different from what Indians have an equal opportunity to learn. Thus, until these tests are rebuilt around specifically Indian cultural and educational materials, they should be used with the greatest of caution.

An Example: Mechanical Aptitude

I shall cite, from my own researches, two examples to justify the word of caution given above: the first is in the realm of mechanical, and the second in the realm of scientific abilities. The numbers of cases are quite small in both instances, so the results must be regarded as only exploratory. However, I do believe that they are worth reporting, as the literature on this subject in India is still extremely meagre.

The Bennett Test of Mechanical Comprehension[1] was administered to (*a*) thirteen Intermediate College first-year students; (*b*) thirty-six third- and fourth-year students of agricultural engineering; and (*c*) seven teachers of agricultural engineering. Tentative norms for each of these groups are compared, in Table I, with various American norms. They show the Indian group to be much lower than the American students.

Table I

SCORES ON BENNETT TEST OF MECHANICAL COMPREHENSION

Country	India					U.S.A.			
Type of Institution	Inter-College	Agricultural Engineering				High School		Women's College	Engineering College
Year ...	I	III	IV	III + IV	Staff	9*	12*	I*	I†
Number of cases ...	13	17	19	36	7	833	300	111	613
Mean ...	23·6	36·5	38·0	37·3	44·6	30·8	38·1	23·3	46·2
Standard deviation...	7·7			6·4		10·4	10·2	9·7	7·7

[1] Bennett, G. K., *Test of Mechanical Comprehension, Form AA, Manual.* New York, The Psychological Corporation.

* American schools have 12 years through high school, *plus* four years of college. Year I in college therefore corresponds to Intermediate year I in India; high school 12 and 9 are one and four years previous to this, and should correspond to Indian 10 or 11, and 7 or 8, depending on the province.

† Engineering students in the U.S.A. begin their four-year course immediately after high school. Year I engineering college is therefore two years previous to the supposed level of year III in Indian Agricultural Engineering. It is, in other words, the first year of a four-year B.Sc. course.

Note especially the following comparisons:

India	*U.S.A.*
Inter-College I	{ High School 9 Women's College I
Ag. Engineering III + IV	{ High School 12 Engineering College I
Ag. Engineering Staff	Engineering College I

How are we to interpret these results? There are three possibilities: (i) Perhaps these small samples are not representative. Yes, that is possibly true. Yet there is no real reason to believe them to be so *extremely* unrepresentative as to explain the fact that the Indian scores are so far below the American scores. A few points of difference might be expected—but not such large differences. (ii) Perhaps Indians have not as much mechanical aptitude as Americans. Yes, that may be true. Though, in the light of what little we know about race differences in abilities, it might be more accurate to say that Indians do not have as much opportunity to *develop* their inherent mechanical abilities as Americans do. (iii) Perhaps the test items were of things less familiar to Indians than to Americans. Yes, this is definitely true. Central heating is practically unknown in India. Relatively fewer Indians than Americans have ever rowed or piloted a small boat. The pictures of these and other such items, on which the test is built, are definitely unfair to Indian subjects.

The second and third of the above possible reasons point to the need for both new items and new norms. So also does the relatively low validity coefficient. The tetrachoric correlation of the Bennett Test of Mechanical Comprehension with average marks in relevant agricultural engineering courses was only +·31 and most of the correlations with specific courses were much lower than this. Bennett[1], on the other hand, reports correlations ranging from +·30 *upwards* to +·64, with various validity criteria. Thus the highest of our correlations was just equal to the lowest of Bennett's; and it was only about 40 per cent of the magnitude (using Fisher's z-transformation) of Bennett's highest.

It is interesting to note, however, that students who had had previous training in physics averaged four points higher than those with no previous physics—which is just exactly the difference which Bennett found. It is also interesting to note that, whereas there is a large difference in the means of our Intermediate and Engineering groups, there is practically no difference between the third- and fourth-year engineers. This suggests that the test *is* measuring something more basic than specific engineering training. It would seem to be worth adapting.

Another Example: Science Aptitude

The need for tests of scientific aptitude is particularly acute where the rigidities of the educational system force a student to choose *either*

[1] Bennett, *op. cit.*

science *or* arts—and to stick by that choice for the rest of his life. What tragedies could be avoided if the student could be helped to make this choice more realistically than is often, at present, the case.

The idea is held by some psychologists that students with higher 'g' (or general intelligence) should go into scientific subjects, and those with somewhat less 'g' are suitable only for arts. This is, of course, preposterous. (As though anyone could dare to say that Nobel Prize Winner Raman was more intelligent than Nobel Prize Winner Tagore!) What are really needed are, of course, differentiated Aptitude Tests, which will predict relative chances of success in various subjects. Such are the Iowa Placement Examinations.[1]

Since the American student takes a well-rounded course of *both* arts and science subjects, the Iowa Placement tests are constructed to help him choose which science (and which arts subjects) he is likely to do best in. There are measures of physics, chemistry, mathematics, English, and foreign language aptitudes. Of these, the tests of Physics Aptitude and Chemistry Aptitude were administered to a carefully randomized sample of first-year science students in an Intermediate College in Uttar Pradesh. The results of this experiment are presented in Tables II and III.

TABLE II

Scores on Iowa Placement Examinations Series 1, Revised, Form A, Physics and Chemistry Aptitude.

	Physics Aptitude		Chemistry Aptitude	
	India	U.S.A.	India	U.S.A.
Number Tested	83	4569	74	8394
99th Percentile	129	165	68	100
Upper Quartile	87	138	45	73
Mean	76·5	117	34·8	57
Lower Quartile	64	100	27	42
1st Percentile	27	50	7	14
Standard Deviation	19·7	26	12·7	21

Table II indicates quite clearly the need for new norms before these tests can be used at all. The Indian students are members of a college which has a good reputation for science results in the Intermediate examination. They come after two years of high school training in science, whereas the American students, on whom the norms are based, are assumed to have had 'no previous instruction in the subject'.[2] Yet, in both physics and chemistry, the 99th percentile for Indian students is below the upper quartile for American students;

[1] *Iowa Placement Examinations: Manual of Directions.* Iowa City, Bureau of Educational Research and Service, Extension Division, University of Iowa.

[2] Ibid.

the upper quartile is near the lower quartile; and the lower quartile is depressingly close to the 1st percentile, the very bottom of the distribution. One of the physics professors, looking at the questions, said, 'These are too hard for our students—they have not learned them yet.' What the American student is expected to absorb from his normal environment of books, magazines, and newspapers, the Indian student is given no opportunity to learn, even in school.

TABLE III

Validity Coefficients for Iowa Placement Examinations Series 1, Revised, Form A, *vs.* Intermediate College Marks.

Physics Aptitude

				Tetrachoric correlation
Part I Mathematics	*vs.*	Year I Physics marks		+·55
„ II Reading	*vs.*	„ „ „ „		+·22
„ III Logic and number series	*vs.*	„ „ „ „		−·23
„ IV Information	*vs.*	„ „ „ „		+·14
Total Physics Aptitude Score	*vs.*	„ „ „ „		+·327+·068*

Chemistry Aptitude

Part I Mathematics	*vs.*	Year I Chemistry marks	+·19
„ II Reading	*vs.*	„ „ „ „	+·30
„ III Finding information	*vs.*	„ „ „ „	+·16
„ IV Information	*vs.*	„ „ „ „	+·32
Total Chemistry Aptitude Score	*vs.*	„ „ „ „	+·352+·071*

* These two correlations were computed by the full product-moment method. The tetrachoric correlation was used as a time-saver for the remaining calculations.

From Table III we learn that the validities of the various parts of the tests are, with the exception of mathematics for predicting physics marks, uniformly low. The validities of the Total Scores are +·33 and +·35. The Iowa tests manual[1] reports average validity correlations of+·50. Thus we find, for Indian students, less than 65 per cent as much predictive value for these tests as for American students.

It is especially interesting to note the extremely low validity of the information section, for physics. This is also borne out by other data not reported here, which indicates that it correlates the lowest with the remaining scores of the test. An item analysis has revealed the items with low reliabilities and validities. The following true-false type items are typical of the type of knowledge the American student is expected to absorb from his environment, but which the Indian student apparently seldom knows: 'Alcohol has a higher freezing point than water.' (In America alcohol is used in car radiators to keep the water from freezing and nearly every boy helps his father care for the family car.) 'Radio waves travel with the velocity of light.' (Most American homes have radios in them, and the scientifically inclined adolescent very often builds his own.) Here, then, are concrete examples of the reason why tests built around American cultural

[1] *Iowa Placement Examinations: Manual of Directions.*

materials may be much more difficult, and unfairly so, for the Indian student.

Summary and Conclusions

After a brief description of modern factor analysis, a representative list of factors was presented. The organization of primary mental abilities was discussed, and the need for and value of aptitude tests explained. A word of caution was given against the uncritical use of American-made tests; and Indian norms and validity coefficients for two such tests were presented as examples.

Of course, one may not legitimately generalize from two tests to 'all American-made tests'. Nor may one place an unduly great amount of reliance on data derived from as small a sample as that reported in the first of these exploratory studies. However, when the logical analysis of the situation is taken into consideration along with the supporting data, I believe the following conclusions to be reasonably tenable:

1. Bennett's Test of Mechanical Comprehension lacks sufficient validity to be used uncritically as a predictor of success in engineering courses in India.

2. The Iowa Placement Examinations, Physics and Chemistry Aptitude, Forms A and B, lack sufficient validity to be used uncritically as predictors of success in physics and chemistry courses in India.

3 If either of these tests is used at all, in its present form, its norms must be scaled down considerably for use with Indian subjects.

4. It is probable that the above conclusions would apply, to a greater or lesser degree, to all but a very few foreign-made tests of aptitudes and abilities.

5. Despite all this, however, the tests in question show enough validity to warrant further research. Construction of Aptitude Tests based on Indian cultural materials, and specifically oriented to the problems of Indian universities, colleges, industries, etc., is much needed.

The Bureau of Educational Research of the Allahabad Christian Colleges is working on this problem. So are a few other individuals in India. All too few, however. There are literally scores of Intelligence Tests available in the various languages of India. (Few of them are of much value, unfortunately.) But the time has come to get down to more basic fundamentals. The problem is not whether or not a student should seek an education. The really crucial problem is what *kind* of an education the student should seek. Only Aptitude and Ability Tests can give him a really scientific answer to that problem.

A. Edwin Harper, Jr.

DO'S AND DONT'S FOR INTELLIGENCE TESTERS IN INDIA AND PAKISTAN

Problems Facing the Test Maker

TWENTY years' experience with Group Tests of various kinds with age ranges from pre-school to high school and adult have led the author to some definite conclusions on composing, giving, and interpreting Intelligence Tests under the conditions we find in India and Pakistan. Some of these may be suggestive to those who wish to try their hand at giving, interpreting, or making up such tests.

Why should conditions in India be so different, in this respect from what they are in America and England? Are children really so different? Probably children are not very different, but their habits are different and the atmosphere of the home and school in which they grow up is different in a number of respects which demand a careful approach in giving such tests. Children have on the whole been encouraged far less to do their own work and their own thinking. A large proportion have been trained to rely on the stock answers to questions given by the teachers. Many pupils have the habit of mind of paying scant attention the first time the teacher tells them to do an assignment but wait and see what the brighter children in the class will do and then imitate them.

Intelligence Tests require original effort. The whole object of Intelligence Tests is to see what individuals can do on their own initiative. A mind that is dependent on other students or on the teacher before going into action is severely handicapped in the test as well as in much of life's demands. The stereotyped, the dependent, the memorizer, the vague and vacillating types of minds have suffered from training which inhibits spontaneous intelligent reaction. The natural endowment of a child showing such symptoms may not necessarily be inferior but he will be retarded in development because of miseducation. There is abundant miseducation in America and England also but India has more than its fair share and this makes the effort to measure intelligence more difficult and leaves a much larger margin of error even where the most careful precautions have been taken. Where special precautions are not taken such measurements cannot be depended upon at all.

When giving Individual Tests the examiner naturally adjusts himself to each individual but when giving Group Tests one is apt to be misled by the fact that some of the pupils understand what is to be done and to ignore a relatively high percentage of the examinees who have no idea of what is demanded.

But let us begin with our do's and dont's. We will not try to separate the do's and dont's but will treat them together.

1. Don't use any foreign test in its original form and expect a fair comparison with pupils of the country of origin of the test. This is more true in the case of verbal tests than in the case of the non-verbal

but it needs to be reckoned with in all cases. The background of Indian children is so different that there are relatively few test items which can be used in one environment as well as in the other. All test items must be tried and standardized under conditions existing in the country in which used.

2. Don't expect examinees under college level to follow printed instructions without further explanation by the examiner. The amount of voluntary reading Indian students do is so little and their experience in following printed instructions is so limited that any test demanding reading is likely to be a Reading Test rather than an Intelligence Test. Not that reading and intelligence are not closely related—they are. In America it has been found that Reading Test scores of college students give a better clue to their probable success in college than Intelligence Test scores do. Yet we wish to measure the intelligence rather than the reading skill. A student who misreads directions in an Intelligence Test will get such a low score as to suggest lack of intelligence which may not be in accordance with fact. The directions in Intelligence Tests can never be too fool-proof. Personally I believe that in tests for use below college level every sub-test should be preceded by demonstration and practice exercises.

It is true that intelligent people comprehend what is wanted faster than those of less intelligence, thus making the following of the direction an Intelligence Test in itself. If you had forty or sixty such sub-tests the following of the directions would in itself constitute a valid Intelligence Test. But when you have only five or even ten such sub-tests (few tests have more than ten, most have above five) the penalty in the case of those examinees who miss even one such sub-test is too severe. It is misleading.

Whenever an examinee scores zero or near zero, or a score so low that the guessing probabilities in the type of test given makes it likely that such items answered were obtained correctly through guessing rather than certainty, we need to assume that the test or the examiner was at fault. The test is simply not fool-proof enough. Or the examiner did not take proper care, or the test was inappropriate for the type of examinee tested, or proper care in giving the test was not taken. To work out tests in which the directions are simple and fool-proof enough under conditions to be found in the general run of Indian schools is one of the major problems of the technique of giving them in this country. I do not know of a single type of sub-test in which more than 95 per cent of the examinees in the average school avoid scoring zero in such items which are so easy that the children would not be in school if they were not intelligent enough to do them. It is rare to find sub-tests in which more than 90 per cent succeed in doing at least enough to show that they understood the purpose. Any test to be generally useful in India must take much greater care in the giving of directions and the selection of only such sub-tests as can be more easily explained than is considered necessary in England or America.

3. Do not consider any test a fair Intelligence Test that is not given in the mother-tongue, unless experience shows that practically 100 per cent of the examinees find no difficulty in the foreign language medium. By mother-tongue we do not mean a dialect but the language which is the most common medium of expression in the examinee's school life. A considerable proportion of the college students who have gradually worked their way into English as the language medium are still handicapped through its use. There is danger of a test in the English medium becoming more a test of English than of intelligence. This is not what we are aiming at.

In some few tests pupils are not particularly handicapped through use of English. For instance, I have found that both high school and college students identify parts of speech of familiar words as well in English as in their mother-tongue, Hindi. But until it is proved that a task is as easy in the second language as in the first, it should be assumed that it is not.

4. The speed element should be stressed less in this country than it is in Europe and America. Of course there are some items which are practically useless as a test unless the time is so limited that only the fastest examinees can finish all items. But these are few. In any test requiring ingenuity ample time should be given for about two-thirds of the examinees to finish all they are capable of finishing. Indian boys and girls are not used to the speed pressures we find in English and American schools. Life is more leisurely. It is unwise to plan a test so that every boy and girl can finish it; but at least the majority should be able to make the attempt. When items are too difficult for an individual he can use considerable time without actually bettering his score. Examinees who have finished are likely to get into mischief looking ahead in the test or going back to do work for which there was purposely a short time limit. Therefore, the time should be sufficient but not too ample.

5. Never begin giving the test until your group is well disciplined. By that I mean that you need to have them under your strict orders so that they listen attentively as soon as you speak, put down pencils immediately when ordered to do so, begin work exactly on time, and have only that page of the test exposed which you want before them. A little time spent on pencil drill, that is raising pencils upon command, putting them down together, etc., is helpful to impress upon them the need for instantaneous obedience. Also it needs to be impressed upon them that they are to do their very best and look neither to the right nor left for help. This needs to be implemented with seating arrangement so that they cannot copy. They also need to be seated so that all can hear well and see any demonstrations to be made. No test can be an accurate measurement if the group is not well disciplined in advance and the arrangements leave little or nothing to chance.

6. Do not trust students to write in their ages themselves. Too many do not know their correct ages. It is always advisable to take

the birth date from the school record even though that also is not too reliable. If you ask merely how old a pupil is, some pupils and even teachers will write ten for the beginning of the tenth year and some will write ten for the completion of ten years of life.

7. Do not take any published norms for Indian children to be a true indication of what to expect from the normal child. Who is the normal child? In England and America practically every child attends school through at least eight classes. The majority of them attend high school or its equivalent. In India about 25 per cent enrol in a school and of these nearly 50 per cent never reach class two. Barely 25 per cent finish four classes and of these the majority fail to continue in middle school. There is another huge dropping out of pupils after middle school. Thus the average pupil in primary school is a different sampling from the average pupil in middle school. He represents a different cultural and social stratum. High school pupils differ even more greatly. It may be possible to find the average primary school, the average middle school, and the average high school pupil, but not the average Indian student regardless of his school placement. Therefore norms cannot be continuous for all ages regardless of school standing, for the development of intelligence is not so independent of environment as to make possible the grouping together of literate and illiterate, over-aged students and superior secondary school children of the same age.

General norms are available for few of the Intelligence Tests used in India or Pakistan and even when available must be used with considerable reserve and discretion. I have found that most schools do best by making comparisons of scores of pupils in their own school. After you have the scores of two hundred or more testees you already have a good means of comparison. You may compare each pupil with the other pupils who are in the school, or who are applying for admission.

Of course, comparison with scores from other schools are useful. But it is to be remembered that conditions vary in schools. In a certain high school in Madras, where I have often tested, the scores are always one to two years of growth ahead of other schools. The reason is not far to seek. This high school is very popular and gets the cream of the students of the city. The pupils come from superior homes and that is a determining factor. Rural schools are at an even greater disadvantage than the average city school in those things which an Intelligence Test measures. Therefore your own school records are likely to be more helpful for useful comparisons than general norms, though the general norms are by no means useless.

8. Intelligence Tests are helpful when used with discretion. But do not expect too much from them. They are only part of the evidence, and it is possible for the test to have failed to make a reliable measurement in any individual case. A pupil's daily work and his general response are also indications of intelligence or lack of it. You

may believe the indication of the Intelligence Test if you have sufficient evidence to corroborate its claims. Do not depend on an Intelligence Test alone. It is much safer to believe the positive indications of a test than its negative; that is if a student has done well and you are sure he did not get the good score by copying or having been coached you may confidently decide he has intelligence of a kind at least. He may not have common sense but he has ability to learn if he wants to do so. But a low score does not always mean that intelligence is lacking unless you have other evidence to prove it. Intelligence Tests are not meant primarily to surprise you by telling you that those whom you considered stupid are smart, and those you considered clever are in reality dunces. There will be very few surprises of that sort. But they do give a much clearer idea of how clever the clever really could be and how backward the stupid really are. When we know this more accurately than our haphazard guess-work in the past has told us, our eyes are opened to learn a great deal more about the individual. An Intelligence Test is not a verdict on the individual but a guide for further study. E. W. MENZEL

Note: The writer assisted the Teachers' Association in Madras to prepare two Intelligence Tests for use in secondary schools, one on the middle school entrance level and the other on the high school entrance level. Since as many as four language media are used in some of the high schools it was necessary that tests be prepared for use in any language area. Therefore the middle school entrance test uses English figures but otherwise neither letters nor figures of any language. The high school entrance test uses a few very simple English words and is usable with anyone who has had two years of English. That is about as close as one can get to a test, usable in all language areas, which still has the advantage of using verbal tests, which are of greater value for predicting school success than the strictly non-verbal.

The sub-tests were chosen after much experimentation to find those which are most fool-proof in their explanations. Practice exercises are included. These tests make the use of Intelligence Tests possible in any school of the country where the limited amount of English mentioned in the previous paragraph is taught. The tests are available from St Christopher's Training College, Vepery, Madras, at two annas each.

A similar test called 'Test for Intelligent Cooperation' for use in primary schools has also been prepared by the writer in Hindi and Oriya. It is difficult to compose a test useful for school purposes on this level without employment of the local language. But the tests can easily be reprinted for other language areas. Hindi and Oriya tests are obtainable from St Paul's High School, Raipur, Madhya Pradesh.

In the composition of all three tests the do's and dont's learned from experience have been incorporated as far as the writer could succeed at this stage of development.

VOCATIONAL GUIDANCE

How Some Difficulties can be Overcome

As they increasingly realize the defects of our present system of education, which leads most young men and women into blind alleys, educationists and statesmen are directing their attention to the imperative need for proper vocational education at different levels. This is a very healthy sign indeed. In different parts of the country various technical courses are now offered as alternatives to the usual academic course. In due course of time this step is bound to check the blind drift or mad rush towards higher University degrees in arts and science.

The most unfortunate fact is that the term 'education' has come to be understood in a very narrow sense. There is so much emphasis on this narrow aspect, that one wonders whether we are not completely wrong. Possessing a degree, a B.A. or an M.A., is considered synonymous with being educated. Yet, if we come to think of it, it is quite possible that by taking a degree a man need not be educated at all in any real sense of the term. At worst he might have had imparted to him some titbits of knowledge with which he does not know what to do after disgorging them in the examination hall. The degree is used in getting a job, but the knowledge gained is seldom used by the majority of students.[1] This state of affairs can only be ended on the one hand by gradually educating the public in the real meaning of education and on the other by providing different suitable alternatives.

Modern psychology teaches us a number of things relevant to the above problems. (i) We know now that there are strong and significant individual differences, in the matter of personality structure, abilities, aptitudes, possible levels of attainment and even in the levels of aspiration. (ii) What is more important is that psychology has developed methods of measuring and assessing these different characteristics to a degree of accuracy that can be depended upon for all practical purposes. (iii) That a number of these abilities and aptitudes can be trained and cultivated to the point of giving adequate satisfaction and pleasure to the individual and make life and work more meaningful. At present, even to many so-called educated people, work is something unpleasant but which has to be done in order to earn their livelihood. Psychology also stresses the need for the individual to realize his limitations, along with potentialities, thus reducing frustration. This understanding of ourselves and the consequent training and learning should be an essential part of one's

[1] We have some evidence for making this statement in the research investigation for an M Ed. Thesis of Madras University, 'An enquiry into the attitude of non-professional married women towards the course of studies and activities pursued by them at the University in the light of their present day needs', by Miss T. K. Nalini, M.A., M.Ed., 1952.

education. (iv) That the individual's efficiency, mental health and consequent outlook on life depend to a large extent on how much his own innate abilities and aptitudes find expression and fulfilment. (If this holds true for individuals, it is clear that the welfare of society as a whole also depends on this fulfilment.)

It is but natural, therefore, that we find a number of educationists and psychologists advocating vocational guidance in our schools or outside. At the same time, one must be aware of the various difficulties and obstacles that stand in the way of such a programme. Otherwise, the enthusiast may do only harm by retarding the final progress and bringing discredit to the science as a whole. Initial failures can be very costly in such a field. The difficulties suggested here are of two kinds. Some of them are rather simple and hence could be overcome. But others are more complicated and involve deep-seated attitudes of the public and the whole economic and social structure. Therefore the psychologist alone cannot solve them.

The chief difficulties of the first kind are three in number: (i) We do not yet have a sufficient number of Aptitude Tests which are standardized for our conditions. Of course, we have a sufficient number of students of psychology in our country to overcome this difficulty, and constructing proper tests need not be a serious obstacle; but this is not as easy as it appears. Psychology has not yet been able to invent tests which may be called pure Aptitude Tests. To a large extent each Aptitude Test involves at least some simple elementary knowledge of the particular aptitude in question. This is not confusing Aptitude Tests with what are called 'Trade Tests'. Even tests constructed after proper job-analysis and reduction to primary factors have to assume some elementary knowledge. This can be made clear by an example. In certain foreign countries which are highly mechanized and industrialized we can safely assume that most of the people will have some elementary knowledge and familiarity about such things if we want to construct a Mechanical Aptitude Test. But we cannot make any such assumption in our country. It was reported by the Chairman of the Selection Committee recently making admissions to the Engineering College, Madras, that he was surprised to find at the interview that there were several candidates who had never even touched a bicycle. At the same time a few candidates may come from homes which possess many modern gadgets. The point at issue is this: even if there is an innate aptitude along a certain line, we can test it only if it had a chance for some kind of elementary expression in the environment. This we cannot yet take for granted in our country. But tests can be constructed for use within limited groups of known environmental conditions.

(ii) For the expression of vocational aptitude and interest, a certain amount of knowledge of the various careers that are available is essential. The average boy in the high school classes has a very limited knowledge in this matter. In an actual inquiry, it was found

that many high school boys knew about only four professional careers—doctors, engineers, teachers and lawyers.[1] They may also know of the particular job a parent is doing. On the whole our boys seem to have poor information about the variety of jobs available. Trade journals and magazines are not commonly found in school libraries. And there is no guidance either on this matter. Education Departments must publish regular bulletins giving short accounts of various trades and professions, giving the required scholastic standards, remuneration, places of training, higher prospects in the particular line, special abilities required, etc.[2] The present writer has visited some schools in the United States where this kind of service is given to the students and made to be a part of their education. Against such a background one can more safely test a pupil's vocational interest and aptitude.

(iii) We have also to decide at what age-level it is best to give vocational guidance—at the high school level, at college or after finishing college. This is important because of the particular system of education we have. During the inquiry into the vocational sense of high school pupils mentioned earlier, we came across many serious problems. Those were days when pupils had to choose optionals in the Vth Form. We came across some pupils in the VIth Form who wanted to be doctors, and who had the necessary intellectual equipment and the financial means, but had taken the wrong optional subjects since there was no one to guide them. Their parents had not been to the university. Even now, in some schools in Madras, unless one takes what is called composite mathematics in the school, beginning from the IVth Form stage, one cannot hope to get into the first group in the Intermediate and then into the engineering profession. So many pupils who may have all the necessary aptitudes may miss a good course because of these determining factors, in the absence of proper guidance. For such simple things the services of a vocational guidance expert or psychologist is not necessary. But the whole problem is fraught with many unexpected difficulties.

The major and more complicated difficulties are four in number. (i) Vocational guidance cannot be given effectively without reference to facilities for further training. We have only a few professional colleges and technical institutions. No one can guarantee admission into these on the strength of a recommendation from a vocational guidance expert. The available seats are so limited and the institutions are run mostly in accordance with Government rules and regulations. Further, we have not yet organized in our country the system of apprentice-training. Very few institutions are available for such a training. Here one has to enlist the sympathy and co-operation of the businessman, the industrialist and the State. The large-scale employer must also be

[1] M.Ed. Thesis, 1945: 'An inquiry into the vocational sense of an unselected group of S.S.L.C. students'.—M. V. Subrahmanyam, M.A., M.Ed.

[2] Attention is however, drawn to the *Rotary Guide to Careers* series, published by the Oxford University Press.

persuaded to see the rationale of such scientific methods. In fact, vocational selection after vocational guidance will be a more paying proposition to the employer. But it will take some more time before this is realized. Some of our big industrialists are accepting scientific methods for selecting their men. But this is completely different from accepting the vocational guidance movement. The recommendations of the psychologist should be acceptable not only to the individual concerned but also to the employer and the business executive.

(ii) Our country presents another peculiar difficulty in the structure of its society. The ancient traditions of castes and communities based on professions have produced many prejudices and attitudes which will hamper any vocational guidance movement. The psychologist has to reckon with this quite seriously and cannot avoid the problem, at least for some years to come. Since various professions run in families, a fact which must be given due weight on making a final recommendation, it is very difficult to make up proper psychographs and yet get them accepted by a rising generation that wants to throw away most of its traditional shackles. The unfortunate part is that most trades and professions carry with them a label indicating a particular social status.

(iii) Our next difficulty pertains to the economic returns of various trades and professions. Vocational guidance pre-supposes a particular kind of economic structure. The wages and prospects in the different vocations must be more or less the same, before the psychologist has the courage to advise a particular individual on the basis of his innate aptitudes alone. Some uniformity in the standards of life and in the income from similarly placed professions must be assured by society before we can think of vocational guidance. But in our country the differences are too sharp and too significant to be ignored. There is a very marked inequality in the pay and possible income which can be derived from various trades and professions.

(iv) Lastly, society as a whole must be educated to accept and use the findings of modern psychology. In a Committee which considered the possibility of making admissions to the Madras Engineering College, on the basis of Psychological Tests, a senior and trusted educationist remarked: 'How can we parents entrust the future of our children to the hands of the psychologist?' It is irrelevant whether the psychologist agrees with him or not. The fact is that such attitudes and oppositions have to be met. Hence the necessity on the part of the psychologist to weigh and consider all the difficulties facing his work lest hasty commitments have an unpleasant impact on such conservative attitudes and thus produce a severe setback for the whole cause of psychology.

G. D. Boaz

STANDARDIZATION OF TESTS OF INTELLIGENCE

Criteria of Validity, Reliability and Objectivity

IT is a hopeful sign that educators in this country have started taking an interest in Intelligence Tests. There are a number of Intelligence Tests available for use but very few of them are standardized on proper statistical lines. In a number of instances these tests are mere adaptations of foreign standard tests. In a recent article published in *The Indian Journal of Educational Research*, R. Prakash[1] discussed some of the difficulties of translating and adapting Intelligence Tests in a different culture. When a test is translated and adapted for use in India, the test-maker should use all the devices of standardization as though he were standardizing a new test. In the present article the writer will briefly discuss the problems that face the test-maker in the process of standardization of verbal tests.

We all know that individuals differ in height, weight and abilities. The fact that we have no difficulty in identifying our friends among the numerous persons we see every day, proves that people differ in physiognomic characteristics. This fact of individual differences is the basis of testing. Intelligence Tests do not measure the absolute intelligence of an individual but rather place him in a group. Every one of us is in the habit of passing judgement on others: a person is either dull or bright, interesting or a bore. When we judge a person in this fashion we merely compare him with another person whom we know. Intelligence Tests aim at assessing objectively an individual's educability in relation to a particular group. Intelligence Tests to be effective should be accurate and serviceable in the sense that they can contribute to the description of individuals and to the evaluation, prediction and guidance of their abilities and performance. Since the test-maker wants to find out the position of an individual in the group it is desirable that he should have an intimate knowledge of the environment of the group to be tested.

WHAT TO TEST

The test-maker's first problem is to define that which is to be measured. The controversy over the meaning of intelligence is well known. In spite of such a controversy one has to decide what aspects of mental activity should be tested. Binet, the originator of Intelligence Tests, considered intelligence to be composed of the following components: memory, mental images, imagination, attention, comprehension, suggestibility, aesthetic appreciation, strength of will, motor skill and visual judgements. Some of these have been accepted by later psychologists while others have been rejected as being invalid. In the

[1] Prakash, R., 'Difficulties of Translating and Adapting Tests in a Different Culture', *Indian Journal of Educational Research*, March 1952.

understanding of the components of intelligence, the contributions of Terman[1], Spearman[2], Thomson[3], and Thurstone[4] are extremely valuable and the works of these psychologists should be consulted by all makers of tests.

Items of a Test

After it has been decided what aspects are to be tested it is necessary to develop a series of items and questions which will best sample traits or functions under consideration. The test should neither be too short nor too long. If it is too short, the accidents of sampling may give a student a score that is not representative of his abilities. Suppose there are exactly 1000 items which would sample the different aspect of one's abilities. Now for practical reasons all the items cannot be used. A test of a hundred items (and in fact many Group Tests have about a hundred items) chosen at random from the thousand would probably yield a good sample. If the student got 75 per cent of the hundred correct, it would be a safe guess that if tested on the entire thousand he would get about 750 right. But if the test contained only ten items chosen at random from the entire thousand the sample would be unsuitable. It is obvious that we cannot take an unlimited number of items, but we should be satisfied that the items selected are representative of the whole field. In many Intelligence Tests items such as the following are found: definition of words, similarities and differences between objects, arithmetical reasoning, repeating digits and reproducing sentences, supplying missing parts to pictures, problems involving distances and directions, logical selection, language completion, paper folding, letter grouping, arranging a series of pictures in logical sequence and explanation of absurdities in given pictures.

In selecting items the cultural background of the pupils should be taken into consideration. Many of the items in foreign tests, even when properly translated, will not make much sense to our children. Here is an example from the Stanford Revision of Binet (1937 edition).

> My neighbour has been having queer visitors. First a doctor came to his house, then a lawyer, then a minister. What do you think happened there?

The item quoted above is all right for a child in Europe or America, but an average Indian child is not likely to understand the situation. In constructing original items too there is difficulty. Whatever items you select they should be, of necessity, based on the experience of the child. The experiences of our children, unlike those of the West, are not standardized. In dress, food habits and in many other things experiences are different in different parts of the country. Then there

[1] Terman, L. M., *Measuring Intelligence*, general introduction (Harrap).

[2] Spearman, C., *Abilities of Man*, chs. i–iii (Macmillan & Co.).

[3] Thomson, H. G., *Factorial Analysis of Human Abilities*, ch. xx (University of London Press).

[4] Thurstone, L. L., *Primary Mental Abilities* (Chicago University Press).

is the question of rural and urban population. The differences in experience are very great between these two categories. In the villages the child is familiar with a few things of nature but not with the amenities of a civilized life such as electricity and the bus, the cinema, the radio, the telephone, and commercialized games such as cricket and hockey. Since areas of experience differ from culture to culture, test items should try to sample those things that are within the experience of the child; otherwise the test will be invalid. In selecting items we should bear another thing in mind. In our society in India boys have the greater opportunity in the field of education. If education is looked upon as modification of behaviour, boys have a much wider scope for coming into contact with reality. They can move about freely and see and learn things for themselves. On the other hand there are many restrictions on girls, and as such the experience of boys is richer than that of girls. Items should not be such as may give undue advantage to the boys. It is always possible to construct a test in which boys will prove superior to girls.

Try-out

We should always select at the initial stage many more items than we need. Thus in a Group Intelligence Test we may need a hundred items. The proper thing would be to take about two hundred items so that even after eliminating the unsuitable items we may retain the required number. An experienced test-maker can select the hundred items out of a smaller number of say 150 items, but it is always safer to have a reasonable margin. In the case of Individual Tests, e.g. the Stanford-Binet, the test items are placed in different age-groups, each age-group having six items. In such cases also it is desirable that we take twelve items in each age-group to start with. These items are intended for use in a small group of say 150 or so to test the suitability of the items. This try-out is essential before the required number of items is finally selected.

Sampling[1]

The next problem is that of sampling. The test-maker has to scrutinize very carefully the sample of population which he is going to use as the basis for drawing conclusions. He obviously cannot test all the men and all the women in his state, not to speak of India as a whole. He has to take a limited sample. But then the question arises, how representative is this sample that he is going to use? There are statistical methods available for deciding the suitability of a sample. But a number of factors complicate the situation. Let us take them one by one.

(*a*) *Age-group of children.* In taking a limited sample we should see that children of different age-groups are represented equally in

[1] Goodenough, J. L., *Mental Testing* (Staples Press), pp. 109–22.

the sample. This could be done by recording the ages of children from school records and taking a fixed number, say a hundred, from each age-group. But the age recorded in many cases is not correct. Except in the municipal areas there is hardly any system of birth registration. For any scientific investigation in the field of mental testing correct chronological age is essential. The legislators should frame such laws which make it obligatory for everybody to get a birth registration certificate when a child is born. This will ensure correct recording of age. In the absence of any such evidence the task of the test-maker becomes difficult. He has to try to get as accurate a chronological age as possible; but there are bound to be errors which will vitiate sampling to some extent.

(*b*) *Compulsory education.* We do not have universal compulsory education in our country. Compulsion has started in some areas but not everywhere. As a result, the majority of children of school-going age are outside the schools. When we select children out of the school-going population only (and in the case of verbal tests we can select only literates) we keep a large number out of our consideration. Such sampling cannot be truly representative of the population. We can however remedy this defect by revising the norms at regular intervals, say every five years. Since educational facilities are becoming available to larger sections of the population, norms will be more and more reliable.

(*c*) *Socio-economic status.* McNemar[1] has shown that socio-economic status of parents has considerable influence on the Intelligence Test scores of children. This being the case we should see that different occupational sections of the population find a place in the sampling. In selecting children we should go to schools in a poor locality as also to schools which are well equipped and have many facilities to offer.

(*d*) *The problem of big cities.* In a city like Delhi where the population is floating and there is an influx of refugees, we cannot entirely depend on children in recognized schools for our sample. To take an example, a little more than three thousand pupils took the examination of the local school board last year, but more than three times that number took the matriculation examination (of the Punjab University) as private candidates. They belonged to privately-owned unrecognized institutions. In this particular instance the sample based on children in recognized schools only will not be representative. The private institutions, although they are more difficult to contact, should also be taken into consideration.

(*e*) *Boys and girls.* In every city or town or village there are more schools for boys than for girls. It is therefore easier to test boys than girls. For the sake of proper sampling however the number of boys and girls should be about the same.

(*f*) *Disparity in educational achievements.* There are good schools and schools which are not so good. Since we are discussing standardization of verbal tests we cannot ignore the influence of schooling. The

[1] McNemar, Q., *Revision of Stanford-Binet Scale* (Houghton Mifflin), pp. 37–9.

sample should include children from different categories of schools having different standards of achievement. School Inspectors should be found useful in giving advice in this respect.

(*g*) *Rural and urban children.* If the same test is meant to be administered to rural and urban children the sample should include both. A test that is standardized say on the children in Delhi schools will not be valid for a child who may come from a rural area. Very often a test is standardized without regard for this distinction and as such the test becomes less useful.

A sample should therefore be such that it is truly representative of the population. We should first of all decide which elements of the population should be included in the sample so that it acquires a representative character, and should act accordingly. There are many practical difficulties, as indicated above, but if we have the scientific spirit we can make our procedures scientific.

Item Analysis

It has already been mentioned that a try-out will be necessary at the initial stage. This is usually done on a small sample. Items are then statistically analyzed. In evaluating items, three of their aspects are usually considered: (i) the difficulty value of each item, (ii) the correlation of each item with the score of a sub-test or with the total score of the whole test, (iii) the discriminating efficiency of each item, that is, the degree to which each differentiates between a high group and a low group.

Of these, we shall discuss the first one in detail. By item difficulty we mean what percentage of students can pass an item. In practice we do not accept an item that is too difficult or too easy. An item is too difficult if less than twenty per cent of the students pass on it and it is too easy if more than eighty per cent of the students pass. It can be demonstrated statistically that an item passed by fifty per cent of a group discriminates between more pairs of persons than does an item passed by say forty per cent or sixty per cent of the group. Let us take an example. An item passed by only ten per cent of the individuals and failed by ninety per cent can discriminate between 900 (10×90) pairs of individuals. If another item is passed by fifty per cent the number of possible discriminations between paired individuals is 2500 (50×50). It is not desirable, however, that items should all approximate this level of fifty per cent pass. We should try to include both easy and difficult items and should avoid extremes.

Reliability [1]

When the test items have been analyzed, difficulty-value ascertained and items finally accepted, it becomes necessary for the test-maker to arrange the items according to the difficulty-values, easy ones first and

[1] Garreth, H. E., *Statistics in Psychology and Education* (Longmans Green), pp. 382-3, pp. 387-91.

then the difficult and more difficult ones. The next step in the process is to find out the reliability. There are a number of ways of doing it but the most common method is to find reliability by the split half method. Reliability of a test ensures that the test administered on different occasions will yield similar results. In the split half method we divide the test into two parts: (*a*) items bearing odd numbers 1, 3, 5, 7, etc., (*b*) items bearing even numbers 2, 4, 6, 8, etc. The successful responses against these items are recorded and correlation between these two sets of scores is found. Split half reliability which is found by the Spearman-Brown formula, is a first check upon the usefulness of a test. It gives us an idea about the internal consistency of the test.

VALIDITY[1]

Lastly we come to the problem of validation. A test should test what it claims to test. A test is satisfactory if it correlates highly with some well-known test. In India we do not have many tests and very few of them are properly standardized. In the absence of a valid test as a criterion, we can use scholastic marks, teachers' judgements of individual's abilities, cumulative scholastic averages over a period of years, number of school grades completed, and chronological age.

Scholastic records are evidence of mental ability even though there are factors other than intellectual ability involved in scholastic achievement. In the case of teachers' estimate we should not forget that there is a subjective bias but even then the teachers are in a position to evaluate individual ability with a fair amount of accuracy because they observe their pupils over a long period. They are also in a position to compare one pupil with another. Instead of getting the numerical assessment of ability in respect of each child independently, the teacher should be asked to rank the pupils in a particular test. This will give more reliable results. The cumulative records are also helpful because they give a better description of the individual than the estimation by a single teacher.

The technique which is generally used in determining validity is to correlate test scores against each criterion. Sometimes test scores are correlated with a number of criteria taken together. If there are five criteria and a test then all these can be treated as separate tests. Inter-correlations obtained from these tests may be used in determining factorial validity by a method known as factorial analysis. Before testing the validity by any of these methods we presume that the reliability of the test is high. We cannot have validity with poor reliability.

Intelligence Tests can serve as a useful measuring instrument only when they fulfil the conditions of reliability, validity and objectivity.

P. K. ROY

[1] Mursel, J. L., *Psychological Testing* (Longmans Green), pp. 34–45.

SUPERNORMAL AND SUBNORMAL CHILDREN

Methods of Testing and Educating

Of all children, the most neglected in every way, in our educational provision, in our educational planning, and even in their own homes and environment, are the children who are exceptionally bright, usually called the 'gifted' children, on the one hand, and the subnormal ones, the idiots, the imbeciles and the feeble-minded, on the other. The reasons for this are as follows. The gifted children are so different from other children in their mental development that they are not properly understood and are even at times regarded as queer or obstinate or highly introverted. The behaviour and activities of the subnormal children on the other hand are often regarded as childish and their undeveloped talk and behaviour are even made much of by unsuspecting parents. This is particularly so early in infancy when the children appear to be normal but are really two or three months behind or ahead of the normal children. This difference of two or three months' retardation or advancement at the age of eight months becomes a retardation or advancement of two or three years at the age of eight years. At about this age, or a little earlier, the difference usually comes to the knowledge of intelligent parents and they begin to suspect some deviation from the normal. Another reason for the neglect of these children is that their number is few. There are only about 1·5 per cent at the upper end who may be designated the 'gifted' children and about 1·5 per cent at the lower end who may be called mental defectives.

Measurement of Intelligence

How to measure these differences exactly in quantitative terms, or, in other words, how to measure intelligence, was a great problem at the beginning of this century. The problem was more or less successfully solved by the great French psychologist Alfred Binet in the year 1908. He gave to the world the concept of Mental Age. He showed how we can find by experiments the mental age of a child and, taking his chronological age into consideration, how we can find how many months or years the child is ahead of or behind his normal development. Later on this idea of difference was improved into the idea or concept of the ratio of the mental age to the chronological age, which subsequently came to be called the Intelligence Quotient or the I.Q. Children who are normal will have an I.Q. of 100. Those having I.Q.'s above 100 will be advanced, and those having I.Q.'s below 100 will be retarded children.

How then shall we detect the supernormal and the subnormal children? The fact is that in the general population there is a gradual rise in all-round abilities or general intelligence from the lowest to the highest. There is no sharp line of demarcation distinguishing one group, such as the subnormal from the normal, or the normal from the

supernormal. The one passes imperceptibly into the other. Further, children who would be regarded as subnormal from certain points of view could be regarded as normal from other points of view.

This brings us to the question of what exactly is intelligence. Without going into an academic discussion on the subject we may say that intelligence is the level at which an individual's mental abilities work. The consensus of opinion on the subject at present is that an individual's intelligence may work in or have outlets through different channels. If then we have to measure this level of intelligence manifesting itself in these several channels we shall have to take into consideration the level of abilities of any individual child attained by him in those channels. Binet assumed that many of these channels are common to the generality of children and tried to determine the level in these common channels. He was highly successful in a way nobody else before him had been. In recent years a common criticism made against his tests is that they are highly loaded with the verbal factor.

There are various other methods employed by psychologists to measure this same general intelligence. One of these is to measure it by means of Group Tests. These again have their own weaknesses. These also are highly loaded with the verbal factor, more perhaps than the Binet Tests. The speed factor is a potent one in these tests. Still another method is to find the level of general intelligence by means of what are called Performance Tests. These do away altogether with the verbal factor but they seem to be too narrow and cannot by themselves measure intelligence. Perhaps the average of the I.Q. obtained by means of the Binet Test and a battery of Performance Tests, such as those of Driver and Collins, would give us the most reliable estimate of general intelligence.

It may be asked how far this general intelligence depends on the physiology of the individual. The answer is, we do not know. Psychologists tried to determine the accuracy of the different physiological aspects on which people at the time thought intelligence depended. Thus they put to the test the size of the head, the physiognomy of the individual and even the lines on his palms. All these failed to satisfy the statistical tests. However, to have some sort of a graphic picture of this we may state that general intelligence depends upon the quality of the brain and the nervous system, and this quality differs in different individuals. Further, just as electrical energy flows better through silver wires than through copper wires, and better through these latter than through iron wires, so we may imagine that the nervous system of some is like that of silver, of others that of copper and still others like that of iron. Since this nervous energy is utilized for the purposes of obtaining knowledge of different kinds according to the interests or aptitudes of individuals we shall have to measure the level of this mental energy flowing through or for the purposes of different activities in the environment. We tap as many

of these channels as possible through which the mental energy may be flowing and find the average level of this mental energy. We call this average level of general intelligence of the individual his Intelligence Quotient or his I.Q. We do not, however, for a moment hold that the I.Q. remains fixed: rather our attempt in education should be to improve each individual to the best of his capabilities.

Distribution of Intelligence

A study of Indian children has revealed the following distribution of I.Q.'s and the following broad grouping into classes has been suggested.[1]

Range of I.Q.'s	Designation of the group	Educational needs of the group	Percentage in round figures
1. 130 and above ...	Extraordinary	Special classes and special attention	5
2. 110 to 130 ...	Superior	Special classes for superior children	24
3. 90 to 110 ...	Normal	Middle stream in ordinary schools	42
4. 70 to 90 ...	Backward	Special classes for backward children	24
5. Below 70 ...	Borderline and mental defectives	Special schools and special institutions	5

For special consideration in this paper we shall select classes (1) and (5) only.

Diagnosis and Treatment of Deviates from the Normal

Out of the 5 per cent in class (1) 1·5 per cent are above an I.Q. of 140 and may be designated gifted children. The remaining 3·5 per cent may be called children of extraordinary abilities. Several studies of gifted children of Britain and America are available. So far no such study has been made in India and there is a great need for similar studies being undertaken in this country. Such children are generally very intelligent from their early childhood. Shrewd observers can recognize that their abilities and activities are far in advance of those of normal or average children. Thus they begin to sit, stand, walk and talk very much earlier. They begin to read also very much earlier and show an extraordinary avidity to grasp all kinds of knowledge quite beyond that of average children. Parents and teachers who find such behaviour traits should put these children through an Intelligence Test as indicated above and get an idea of

[1] See Kamat, V. V., *Measuring Intelligence of Indian Children* (Oxford University Press, 1951), p. 80.

the exact level of their brightness in terms of their I.Q.'s. There is a common belief that such extraordinarily clever children are generally weak in physical constitution and more unbalanced in emotional development. The facts as found out by careful studies of such children do not testify to this belief. They are, as a matter of fact, found to be better developed in physique than the average—they are taller and heavier on an average than the normal group. They are also found to be more balanced in their emotional growth and test higher in desirable emotional qualities. This in general is so, but of course there may be individual cases where the physical development may not be in keeping with the mental development.

Similarly the growth of the 5 per cent children at the lower end is slower than normal. They begin to sit, to walk and to talk very much later. A child of four or five years may behave like a child of three years. The pity is that the development of the majority of such children generally parallels the growth of normal children though at a much lower level. Hence parents cannot suspect deficiency unless it is definitely pronounced. Parents make much of and even fondle their children the more on account of their defective talk, which they do not suspect arises out of their mental retardation. If such children are sent to the psychologist and put through a mental test a clear verdict can be obtained.

Education of the Supernormal

When cases of extraordinary children have been diagnosed it should be the duty of educational authorities to provide facilities for their proper growth and development. If they are sent to the ordinary schools where education is adjusted to the needs of the majority, namely, the average children, they suffer from neglect. They are much above the average and finish their assignments in a much shorter time, and then find their time hanging heavily on their hands. As a result they are found to be inattentive or engaged in some sort of mischief in the class.

There are three principal ways of meeting the educational needs of such children. One method is to give them accelerated promotion. This can, however, be done only on occasion, and even if it is made administratively possible by suitable arrangements to avoid discontinuity of instruction, educationists are generally opposed to this method. The objection they raise is that such children, after one or two accelerated promotions, will find themselves too young for the class into which they have been promoted and will find it difficult to adjust themselves socially in the class of older boys or girls. The second method is to have special divisions for such children in every standard. This is only possible in large schools where there are several divisions in each standard. In large cities an experiment may also be tried to open a school for children of high intelligence. The advantage of such a system would be that teachers would be able to carry on their

work at a higher level suited to the intelligence of such children. Some parents might object to such a segregation of the bright children as it deprives the ordinary children of the benefits of association with children of superior intelligence. There is not much point in this objection as even in the same class it is found that children of the same level usually associate together. It is very rare for the ordinary child or the child of subnormal intelligence to associate with a child of high intelligence.

A third method which may go along with the second is to make such children proceed year by year along with the average children but to prescribe for them an enriched curriculum. While children of average ability may be satisfied with the ordinary prescribed curriculum and textbooks, children of superior intelligence should be advised to read supplementary books. Great care and attention require to be given to this question as the proper development of such children is a question of vital interest for any progressive nation. At every stage in the growth of children from year to year such extra books suitable to the level of their growth should be made available to them. Children's free libraries should also be organized at several centres in big cities and towns at no great distance from the children's residence.

Indian literature rich in folklore and mythology should be rendered into language with a vocabulary and style suitable to the children of various ages by writers of children's books. In the same way suitable history books should be produced. In geography, travel books, atlases, railway maps and time-tables should be at hand, either in the school, at home or in children's libraries. In general science, stories of scientists and their discoveries should be specially prepared for such children. Reference books such as dictionaries, biographies and children's encyclopaedias must be made specially available to such children of high intelligence in order to satisfy their hunger for knowledge. Most of this literature should be in the mother-tongue of the children. In mathematics, the textbook writers should produce books with sets of examples of different orders of difficulty. The average children should attempt only the easier exercises and the more advanced children should attempt the more difficult sets. Most of our schools, as they are at present, have no clear notions of the requirements of such superior children and make no provision for them. In the same way sufficient constructive play material, such as the Meccano and building blocks, should be given to these children by their parents or at the play centres in the town. Parents should remember that money spent on such things will be repaid several times in the form of the very valuable mental growth of the children.

Education of the Subnormal

Finally let us consider the educational needs of retarded children. We have taken the lowest 5 per cent of the general population for consideration. Of these the upper 3·5 per cent are of I.Q.'s between

60 and 70 and may be considered as borderline cases. In large schools where there are sufficient numbers they can be taught in special classes. They would, however, be taught best in special schools. They will be fit to receive only an elementary education. Their curriculum should also be very simple, not much beyond the three R's. They will be fit in adult life only for certain non-skilled occupations.

The lowest 1·5 per cent, called the mental defectives, are strictly uneducable. Uneducable that is in our ordinary schools and in the sense in which we use the term education; at the higher level usually called the feeble-minded (or morons according to American terminology). The I.Q.'s are from the 40 to 60, these form about 1·25 per cent. The next are the imbeciles with I.Q.'s of 20 to 40; they form about 0·3 per cent; and the lowest, the idiots, have I.Q.'s below 20 and these form about 0·075 per cent of the general population.[1] Or in other words, in a population of one lakh of people there will be a little more than 1000 feeble-minded persons, 300 imbeciles and 75 idiots. This class of mental defectives requires to be housed in special institutions or homes. These unfortunate children will be more of a burden on society than useful members of it. The aim to be kept in view in educating them should be to train them to the best level they are capable of attaining. The best of them, the feeble-minded, can be trained with persistent effort to do certain useful things such as sweeping the floor, digging in the garden, helping in the kitchen and even simple cane-work or sewing.

With regard to the imbeciles we should be satisfied if they can be taught to look after themselves and cultivate clean habits. They can be taught to dress themselves, help themselves to eat, and to learn habits of personal cleanliness. The idiots are the most difficult to deal with. Fortunately they are very few in number. The imbeciles and the idiots will have to be kept in institutions throughout their lives. They cannot be let loose lest they become a danger to society.

Nurses and teachers who are to be in charge of these unfortunate children have to be carefully trained. Very great patience is required on the part of such persons. To teach imbecile children even such simple things as putting on a shirt and buttoning a coat would require repeated and patient teaching until they can do these things themselves without aid. Each such child is usually an individual by himself and unlike all the rest. In course of time they get into a few stereotyped habits, which peculiarity psychologists call stereotypy. Nurses and teachers have to give individual attention and no group work is possible. Consequently each teacher or nurse can manage only a few children at a time, not more than 7 or 8 at the most. Enlightened

[1] No investigations about these have as yet been made in India. The above estimates are taken from Dr Lewis's investigations in Britain, which more or less hold good in India also.

society should look upon making institutional provision[1] for such children as its sacred duty, in order to make their lives as happy as possible and to make society safe from the nuisance that would be caused if they were let loose. At present there is no provision made for such children in our country except for a few remand homes and delinquent children's homes. These are meant for delinquent children, of whom a large percentage are found to be mental defectives.

V. V. KAMAT

[1] See Kamat, V. V. *Measuring Intelligence of Indian Children* (Oxford University Press, 1951), Appendix B, p. 224.

REFERENCES

1. Hollingworth, L. S., *Gifted Children* (Macmillan Company, Inc., New York, 1929).
2. Kamat, V. V., *Measuring Intelligence of Indian Children* (Oxford University Press, 1951).
3. Macdowall, Margaret, *Mentally Defective Children* (Law and Local Government Publications, London, 1930).
4. Parkyn, G. W., *Children of High Intelligence* (New Zealand Council for Educational Research, 1948).
5. Terman, L. M., *Genetic Studies of Genius* (Stanford University Press, 1925).
6. Tredgold, A. F., *Mental Deficiency* (Balliere, Tindall and Cox, 1920).
7. *Report of the Mental Deficiency Committee* (H.M. Stationery Office, 1929).
8. *The Education of Backward Children* (H.M. Stationery Office, 1937).

BIBLIOGRAPHY OF INTELLIGENCE TESTS

Foreign Publications

Ballard, P. B., *Group Tests of Intelligence*, University of London Press, 1949.

Ballard, P. B., *Mental Tests*, University of London Press, 1948.

Bingham, Walter Van Dyke, *Aptitudes and Aptitude Testing*, Harper Bros., New York, 1936.

Burt, Cyril, *Mental and Scholastic Tests*, London City Council, 1921.

Driver, J. and Collins, M., *Performance Tests of Intelligence*, Oliver and Boyd, Edinburgh, 1946.

Freeman, F. N., *Mental Tests*, G. G. Harrap & Co. Ltd, London, 1939.

Greene, H. A., Jorgensen, A. N. and Gerberich, J. R., *Measurement and Evaluation in the Secondary School*, also *Measurement and Evaluation in the Elementary School*, Longmans Green & Co., New York.

Hamley, H. R., *The Testing of Intelligence*, Evans Bros., London, 1935.

Hunt, E. P. A. and Smith, P., *The Teachers' Guide to Intelligence and Other Psychological Testing*, Evans Bros., 1935.

Knight, Rex, *Intelligence and Intelligence Tests*, Methuen & Co., London, 1933.

Pintner, R., *Intelligence Testing*, Henry Holt & Co., New York, 1930.

Psychological Tests of Educable Capacity, H.M. Stationery Office, 1924.

Stephenson, W., *Testing School Children*, Longmans Green & Co. Ltd, London, 1949.

Symonds, P. M., *Measurement in Secondary Education*, Macmillan Co. Inc., New York, 1930.

Terman, L. M., *Measurement of Intelligence*, G. G. Harrap & Co. Ltd, 1919.

Terman, L. M. and Merrill, M. A., *Measuring Intelligence*, G. G. Harrap & Co. Ltd, 1937.

Valentine, C. W., *Intelligence Tests for Children*, Methuen & Co., 1948.

Indian Publications

Kamat, V. V., *Measuring Intelligence of Indian Children*, Oxford University Press, Second edition, 1951. Also in Marathi and Kanarese.

Kumria, R. R., *Intelligence, Its Nature and Measurement*, Gulab Singh & Sons, 1936.

Menzel, E. W., *Suggestions for the Use of New-Type Tests in India*, Third edition, Oxford University Press, 1952.

Rice, C. H., *A Hindustani Binet-Performance Point Scale*, Oxford University Press, 1929.

V. V. Kamat and E. W. Menzel

BOOK REVIEWS

Progress of Education in India, 1937–47 (Decennial Review, Vol. I). Pp. xii + 320.

Education in India, 1947–48. Pp. viii + 168. Rs 6-2.

Education in the States of Indian Union, 1948–49 (A Statistical Survey). Pp. iv + 196. Rs 8-4.

Education in Universities in India, 1948–49 (A Statistical Survey). Pp. vi + 178. Rs 7-8.

Each 9½″ × 6½″. Manager of Publications, Delhi.

Whichever way you look at it, the history of education in this country has been a pretty sad affair. In the face of impediment after impediment, it has but tottered along the path of progress, either stumbling against the block of language medium, sinking in the slough of apathy or falling flat on its face before the apparition of financial destitution. The inability of our educationists and politicians to produce an imaginative and progenitive educational system is reflected at the last scholastic level in the thousands of our university students whose individual ambitions centre much more on the attainment of academic qualifications than on that of culture and of knowledge. And in this respect (i.e. educationally), statistical surveys have little value and even deflect attention from the central problem, confining themselves, as they must needs do, to recording teacher output, *per capita* expenditure, examination figures and the like. Economically, however, their value is obvious. Our educational economy has two characteristics. First, that it is largely formed by circumstance, by events outside the control of educationists. 'Independence is at any time a heavy responsibility, and in the context of partition, it brought in its wake many colossal problems. At a time when the Government was already preoccupied with the post-war problems of food shortage, scarcity of all consumers' goods, rising prices, and unemployment, they had suddenly to face the problem of the rehabilitation of millions of people displaced in the aftermath of the partition. Such factors were bound to have their repercussions in all spheres of national life, and education could not escape.' Second, that no matter how great a control economic circumstance must have, there will always be an element of man-made policy—a reflection of the conceptions and aspirations of those who control our educational fortunes. The purpose of education has been said to embrace two diametrical opposites as one integrated whole, namely, satisfying the occupational needs of society and fully and harmoniously developing the individual. Have our educationists realized the essential fact that only the fully developed individual can make the good citizen? If we have been wrong, if too much value has been put on examinations, academic standards, Government control, prescription of textbooks, language mediums and all the paraphernalia of an over-highly administered system, how can we put it right? One way only, by training first-rate teachers—men and women with a liking and aptitude for teaching—by respecting them and paying them and then by *putting our faith in them* and their influence on those minds which they must so largely control. But in whose hands do we find the power now, in 1952? In those of the very local bodies 'whose members', wrote the 1944 Central Advisory Board, 'are in the main uneducated or uninterested in education or both'.

The first volume under review contains the 1944 Report of the Central Advisory Board of Education, together with its recommendations for post-war educational development and a supplementary five-chapter introduction by Sir John Sargent, then Educational Adviser to the Government of India. These act as a valuable foreword to the statistical record of the remaining volumes, and should be read by all who seek rededication to the cause of social justice. The truth of the precepts 'If India wants a proper system of education, she will have to follow the practice of other countries and pay for it' and 'If the labourer is worthy of his hire, then of all labourers, the good teacher is the most worthy of his', is as great today as ever it was. And the watchwords 'quality and quality and quality' are of even greater urgency.

Education in the States of Indian Union gives, state by state, area and population, number of institutions, number of scholars on rolls, educational expenditure, number of teachers and examination results for the year 1948–9. This information is

preceded by a table showing the various schemes of school classes as practised in the states with notes on the medium of instruction in the different standard groups. Suffixed are tables showing the personnel employed in the state educational directorates and inspectorates, their duties, scales of pay and educational qualifications. *Education in India* fuses similar information for the previous year and in addition offers notes on aesthetic education, physical training, school medical services, school meals (puffed rice, molasses, milk, coconut, bananas, seasonal fruits, sweets, nuts and grams in West Bengal, costing 9as per head per month), scouts and guides and Indian students abroad (scholars studying at Oxford and Cambridge were paid £460 stipend per annum). The main body of the publication is devoted to the general headings, primary, secondary and university education, the last giving a slight indication of trends when conjoined with the data for 1948–9 as given in *Education in Universities in India*. The economic criterion of university education being the cost per student per annum, it is interesting to note that this varied by as much as Rs 1,000 between Rajputana (Rs 1,200, the highest) and Jammu and Kashmir (Rs 200, the lowest). The average cost for all universities was just under Rs 600, of which Rs 160 went to the university teacher who was paid the average princely salary of Rs 255 per month. He will therefore read these publications with interest, should somebody have the kindness to donate them to him.

* * *

Suggestions for the Use of New-Type Tests in India. By EMIL W. MENZEL. Cr. 8vo. Pp. viii+282. Oxford University Press. 1952. Rs 3-8.

This third edition of *Suggestions for the Use of New-Type Tests in India* is out after an interval of ten years. There are not many changes in this edition. Not many changes were demanded either, for there has not been much progress in the use of objective tests in this country, during the last ten years. In other countries also, the whole movement of scientific measurement in education has been subjected to severe criticism, and the new-type tests, especially Intelligence Tests, have not come out entirely unscathed. The author himself has summed up the position admirably. 'There is less faith', he says, 'in the infallibility of Intelligence Tests, and in all tests for that matter, including scholastic as well as psychological, than there was, but at the same time there is more widespread and consistent use wherever their use has once been established.'

The use of objective tests for purposes of examination has received some recognition at the hands of Education Departments in this country, and the recent University Education Commission has strongly recommended their use at the higher stages of education. In Bombay State, objective new-type tests in school subjects are being used for the middle and high school scholarship examinations. The whole position, however, has not yet been fully stabilized.

The author has rightly pointed out that standardization of good Subject or Achievement Tests is the most practical aspect of the entire movement towards scientific measurement in education and will have far-reaching repercussions on the methods of teaching followed in schools. It is unfortunate that the construction and standardization of such tests should be left to students seeking Master's or Doctor's degrees and should remain perpetually at the experimental stage. This work needs to be followed up by regular and systematic use of these tests in schools.

The book under review is a valuable guide to the student-teacher as well as to the teacher who has not got into a rut and is prepared to undertake experimentation in his day-to-day work. Besides giving a fairly complete list of the existing tests, especially those framed and standardized in India with Indian children, along with a brief description of each, it discusses the underlying statistical devices and gives detailed directions for framing new-type tests. The chief recommendation of the book is the lucidity of its style and the clarity of its exposition which have made a somewhat abstruse subject clear and interesting.

Printed by Hugh Warren at the Wesley Press and Publishing House, Mysore City and Published by Geoffrey Cumberlege at the Oxford University Press, Bombay

Blackie

Mental and Scholastic Tests. *Third Edition*

SIR CYRIL BURT, M.A., D.Sc. (OXON), LL.D.

This famous book, the present edition of which has been carefully revised, gives a systematic account of the use of standardized tests of intelligence and of school attainments for the purpose of assessing the ability and work of school pupils.

Staples Press Ltd. Royal 8vo. 467 pp. 35*s net*

Handbook of Tests for Use in Schools. *Second Edition*

SIR CYRIL BURT, M.A., D.Sc. (OXON), LL.D.

Reprinted from *Mental and Scholastic Tests* with a new Preface and an Introduction to teachers explaining how to use the tests.

Staples Press Ltd. Royal 8vo. 110 pp. 10*s* 6*d net*

INDIVIDUAL TESTS

Tests numbers 1, 3, 5, 6, 9, 10, 11-14 from *Mental and Scholastic Tests* are now published separately for individual class use:

Test 1	READING. *Vocabulary Test*	Paper 2*d* each Card 3*d* each
Test 3	READING. *Speed Test*	Card 6*d* each
Test 5	READING. *Comprehension Test*	Paper 1½*d* each Card 1½*d* each
Test 6	SPELLING. *Graded Vocabulary Test*	Card 3*d* each
Test 9*	MECHANICAL ARITHMETIC. *Graded Test*	Paper 2*d* each Card 3*d* each
Test 10*	PROBLEM ARITHMETIC. *Graded Test*	Paper 4½*d* each Card 6½*d* each
Tests 11–14*	MECHANICAL ARITHMETIC. *Fundamental Rules*	Paper 3*d* each Card 6*d* each

Staples Press Ltd. *Plus Purchase Tax

Mental Testing FLORENCE L. GOODENOUGH

'Professor Goodenough's new book is designed as a reply both to enthusiasts and to sceptics . . . It is well worthy of study by both groups.' —*Schoolmaster*

Staples Press Ltd. Demy 8vo. 609 pp. 42*s net*

The Application of Psychological Tests in Schools

By NOEL E. WHILDE, B.Sc., Psychologist in charge, Sheffield Child Guidance Centre, in preparation. (*Technique of Teaching Series.*)

BLACKIE & SON (INDIA) LTD

BOMBAY :: CALCUTTA :: MADRAS

COMMON GROUND

Educational

FILMSTRIPS

Prepared by eminent subject experts, each strip is complete with comprehensive Teaching Notes which include frame-by-frame comment. Wide range of subjects. Over 500 titles!

Specimen Titles

Regional Geography
- Ganges Basin
- Indus Basin
- Peninsular India
- Burma
- China
- Asiatic Russia
- The Ukraine
- Africa
- Nile Valley
- Swiss Alps
- Canadian Prairies
- The Cotton Lands
- Temperate Grasslands
- Equatorial Forest
- Brazillian Plateau

How it Works
- Human Body
- Radio

Physical Geography
- Lakes
- Rivers
- Snow and Ice
- The Seaside
- Mountains and Hills

Mathematics
- Introduction to Area
- Area of a circle
- Theorem of Pythagoras
- Introduction to Graphs

Nutrition
- Food and Health
- Carbohydrates and Calories
- Fats and Proteins
- Vitamins and Mineral Salts

Sciences
- Levers
- Sources of Energy
- Calcium and its Compounds
- Sulphur and its Compounds
- Electricity and Magnetism
- Telephone
- Introduction to A.C.
- Introduction to Radio

Physical Education
- Posture
- Swimming
- Football
- Hockey
- Relay Racing
- Sprinting
- Hurdling

16mm Films

Available on all Subjects, e.g.

- Testing Intelligence with Stanford-Binet
- Testing the I.Q.
- Aptitudes and Occupations
- Choosing your Occupation
- Finding the Right Job
- How to keep a Job
- You and Your Work
- Planning for Success
- Improve your Personality
- Developing Responsibility
- Developing Leadership
- Developing Self-Reliance
- Developing Your Character

Write for Free Catalogues to

NATIONAL EDUCATION & INFORMATION FILMS LTD

NATIONAL HOUSE, APOLLO BUNDER, BOMBAY

For

NEW RAILWAY MAPS OF INDIA

(including the zonal changes of 14 April, 1952)

Rs 8-8 each

Write—Visit—Phone: 7190, N. Delhi

CLIFTON & COMPANY

Map Publishers

Branch	Head Office	Sale Depot
Kamdar Chambers,	Hitkari Building No. 1	Nai Sarak
Sion, Bombay—22	Delhi—Karolbagh	Delhi

PROMPT. RELIABLE. EXPERIENCED **Printing Service**

Highly efficient mechanical typesetting plant, and the latest machinery for economical and speedy production

HEADLEY BROTHERS

109 KINGSWAY, LONDON, W.C.2

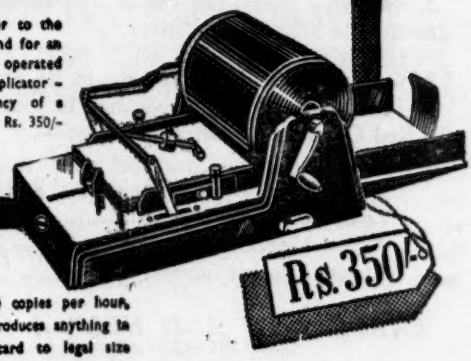
Works: The Invicta Press, ASHFORD, Kent, England

Educational and Technical Books a Speciality

SPEED-O-PRINT

AUTOMATIC DUPLICATOR

Here's the Answer to the wide-spread demand for an efficient, simply operated and economical Duplicator – gives you efficiency of a minature press for Rs. 350/-



Simple to operate – 4000 copies per hour, accurate registration, reproduces anything in any colour from post card to legal size documents that can be typed, drawn, traced or photographed on a stencil — neat streamline appearance — spares and accessories available always.

Sole Distributors in India & Pakistan :-

GOVINDRAM BROS. LTD.

139, Medows Street, Fort, Bombay.

THE Indian Red Cross Society was established by Act XV of 1920. Its headquarters are at 20 Talkatora Road, New Delhi, and its activities are decentralized and carried on through 26 State Branches and 290 District Branches throughout India.

THE funds of the Red Cross are utilized for help in war and peace to Services personnel and for its manifold other humanitarian activities. Its main peacetime activities are:

Medical after-care of all services personnel

Maternity and Child Welfare

Training of Health Visitors, Nurses, Dais and Public Health propaganda

Relief work in times of flood, famine or epidemic

The supply of hospital comforts and amenities to Military and Civil Hospitals

Co-operation with the St John Ambulance Association in the training of men and women in first aid and home nursing.

THE Junior Red Cross is the youth section of the Red Cross. It is spreading far out into rural areas and has for its aims the promotion of health, service and international friendship. It also trains its members to pursue healthy habits and obtain elementary knowledge of first aid, nursing of the sick and safety first. There are nearly 10,00,000 Juniors in India as compared to 17,000 adult members. Schools constitute the ground for the development of the Junior Red Cross, the teachers acting as Counsellors around whom the Junior Red Cross activities function.

THE Indian Red Cross Society has a fixed income derived from invested capital but this is supplemented by Annual Fund Raising and Membership drives.

TO join the Society and help in its humanitarian work you can be enrolled on application to your State Secretary or to the Red Cross Headquarters as a

Life Member with a subscription of	Rs	150
Life Associate Member	,,	50
Annual Members	,,	12 per annum
Annual Associate Member	,,	1 to 11 per annum

ENROL NOW AND HELP A GOOD CAUSE

THE INDIAN RED CROSS

TEACHING IN INDIA SERIES

Includes many useful handbooks for teachers on a variety of subjects. Two new titles have just appeared:

Vol. XIX

HOW TO STUDY by Emil W. Menzel

276 pp. Rs 4

In the belief that study is a two-way business involving both teaching method and student application, Mr Menzel has intended this book for teacher and student alike. In the first part addressed to the teacher Mr Menzel explains how the student can be taught to concentrate, to observe accurately, and to exercise his memory. Practical advice is given to the student on how to study a textbook, how to summarize, how to take notes, how to analyse problems and how to make full use of the science laboratory and extra-curricular activities.

Vol. XX

PLAY-WAY SUGGESTIONS by W. M. Ryburn

144 pp. Rs 3-8

After a theoretical discussion of the social and physical benefits of play-activities, stressing the importance creative work plays in the development of the child, the author gives many practical suggestions about ways in which the play-way system of teaching can be introduced into the regular school work.

The third edition of Emil W. Menzel's

SUGGESTIONS FOR THE USE OF NEW-TYPE TESTS IN INDIA

282 pp. Price Rs 3-8

was published in August 1952. *The South Indian Teacher* comments

'We welcome the new revised edition of this book wherein the author has also listed most of the recent experiments carried out in India. . . The book is well got up and will be an excellent help to all teachers. It will be a most useful and oft-consulted book in every school library.'

Please ask for a full list of the Series

OXFORD UNIVERSITY PRESS

MEASURING INTELLIGENCE

A Guide to the Administration of the New Revised Stanford-Binet Tests of Intelligence

By Dr Lewis M. Terman and Maud A. Merrill

Pp. 476 12*s.* 6*d.*

These tests have a wider range than the original Stanford Revision and offer the advantage of retesting material in two equal and parallel scales. The time required depends on the age of the pupil.

Record Booklet. *Forms L. or M. 25 copies, 8s. 6d.*
Record Form. *Forms L. or M. 25 copies, 4s. 6d. 100 copies, 14s. 6d.*
Printed Card Material in packet. *Forms L. and M. 5s. 6d. each.*
Coloured Beads. *Per box, 3s. 6d.*
Extra Writing Pads for Terman Sets *12 Pads, 6s.*
Box of Performance Materials, *L. 95s.*
Box of Performance Materials, *M. 75s.*

OTIS GROUP INTELLIGENCE SCALE

By Arthur S. Otis

An absolute point scale to measure scientifically and rapidly in groups the native mental ability of children. Tests can be completed in an hour.

Primary, Forms A and B. *25 copies of either Form and 1 Class Record, 6s. 100 copies and 1 Class Record, 21s.*
Advanced, Forms A and B. *25 copies of either Form and 1 Class Record, 7s. 6d. 100 copies and 1 Class Record, 27s. 6d.*
Manual, *with Norms, 1s. 9d.*
Examiner's Key, *9d.*
Specimen Set, *containing one each Primary Forms A and B, and Advanced Forms A and B, Manual, Key, Class Record, 4s. 6d.*

CATTELL INTELLIGENCE TESTS

By Raymond B. Cattell

It has been the object of the designer of these tests to produce a set of intelligence scales capable of testing the whole range of intelligence development from that of the normal child of four to that of the moderately gifted adult, and constructed throughout on uniform principles. They are fully standardized.

Scale O. Dartington Scale. For mental ages 4–8 years. *Examiner's Set: 50 Test Forms, Cards for Test II, Handbook and Norms, in large envelope, 35s.*
Test Forms, *6d. 25 copies, 10s. 100 copies, 37s. 6d.* Teachers' Handbook, *with Norms, 1s. 9d. Cards for Test II (Line's Test), 13s. 6d.* (a classification test, explained in the Handbook).
Scale I. Non-verbal. For mental ages 8-11. *Forms A and B, 6d. each. 25 copies of either, 10s. 100 copies of either, 37s. 6d. Time: 27 minutes.*
Scale II. For mental ages 11-15. *Forms A and B, prices as for Scale I. Time: 66 minutes.*
Scale III. For mental ages 15 and upward. *Forms A and B, prices as for Scale I. Time: 66 minutes. A Practice Test is provided with each Form in Scales II and III.*
Examiner's Keys to 1A, 1B, 2A, 2B, 3A, 3B, *2s. 6d. each.*
Handbook (for Scales I-III). *Third edition revised, with new table of Norms, 2s. 6d.*
Specimen Set, *including Handbooks, Scale O Test Form: Scales I-III. Forms A and B, 7s. 6d.*

Full details of Harrap's Intelligence Tests are given in HARRAP'S I.Q. LIST

GEORGE G. HARRAP & Co. Ltd

Agents in India

OXFORD UNIVERSITY PRESS

REEVES'

This fine box has three deep mixing palettes in the lid and contains twelve pieces of Reeves' Students' Water Colours and a brush. The box is of black japanned tin and has the famous DOG TRADE MARK on the lid.

'THE DOG BRAND'

TRADE MARK

ACADEMY BOX

REEVES & SONS LTD., DALSTON, LONDON, ENGLAND

THE EASY WAY TO ENGLISH READERS

By INA DEAN, B.A. (Hons)

Diploma in Pedagogy, University of London

The books are graded to begin with practice in letters, words and simplest constructions; go on to little reading pieces in correct and idiomatic English, with stories, fables, letter-writing, rhymes and poems, easy in vocabulary and style; exercises involving vocabulary and grammar, avoiding formal teaching, with devices of substitution tables, opposites, true and false tests, joining, filling in blanks, straightening jumbled sentences, etc.

Reader I for Form I, Re 1–1; Reader II for Form II, As 15;
Reader III for Form III, Re 1–2; Reader IV for Form IV, Re 1–4;
for Form V, Re 1-8

By the same author

ENGLISH GRAMMAR AND COMPOSITION

Book I for Form II, As 12; Book II for Form III, Re 1;
Part I for Form IV, Re 1–4; Part II for Forms V & VI, Re 1–12

P. VARADACHARY & CO.

Booksellers and Publishers, 8 Linghi Chetty Street, Madras 1

UNESCO PUBLICATIONS

We have the pleasure to announce that we have been appointed sole agents in India for UNESCO Publications. We shall be glad to fill orders from initial stocks which have arrived.

A FEW BOOKS ON INTELLIGENCE TESTING

Testing School Children—An Essay in Educational and Social Psychology by W. STEPHENSON. With Illustrations and Diagrams **14s.**

This arresting and challenging study of the use of intelligence and other tests in education deals with children in a social setting and will be found particularly valuable to those concerned with the problem of selecting children for various types of secondary school education.

Examinations in India by DR SALAMAT ULLAH. (*Theory and Practice of Teaching Series*) **Rs 4.**

Exposes the defects of the system of examinations in India and suggests remedies.

Cumulative Records by C. M. FLEMING **1s. 9d.**

This is the first of a series of booklets in which the Research Department of the Institute of Education propose to present a simple introduction to certain methods of Educational Research. It deals with the whole question of record cards and their use.

Psychological Testing by JAMES L. MURSELL **4 $.**

Covers both the basic theories of mental measurement and their application.

The Measurement of Abilities by PHILIP E. VERNON, M.A., Ph.D., Psychological Research Advisor to the Service Departments and Civil Service Commission. **15s.**

Demonstrates the principles underlying the use of mental tests, scholastic examination of constructing tests, applying tests and interpreting the results both of tests and examinations.

Personnel Selection in the British Forces by PHILIP E. VERNON and JOHN B. PARRY **20s.**

A detailed account of the application of methods of vocational classification to wartime as well as peacetime requirements.

RECENT BOOKS ON EDUCATION

A New Deal for Our Universities by DR K. R. SRINIVASA IYENGAR **Rs 4.**

A penetrating study of the problems of university education in India and of suggested measures for its reform.

Education in Free India by K. N. SRIVASTAVA **Rs 2.**

A searching analysis of recent educational trends and problems.

JUST PUBLISHED

Modern Staff Training—A Survey of Training Needs and Methods Today by F. J. TICKNER, Director of Training and Education, H.M. Treasury. **12s. 6d.**

No one concerned with the handling of staff will fail to find in this book much that is helpful in solving his many problems.

ORIENT LONGMANS LIMITED

Bombay Calcutta Madras